AGRICULTURAL *Chemicals*



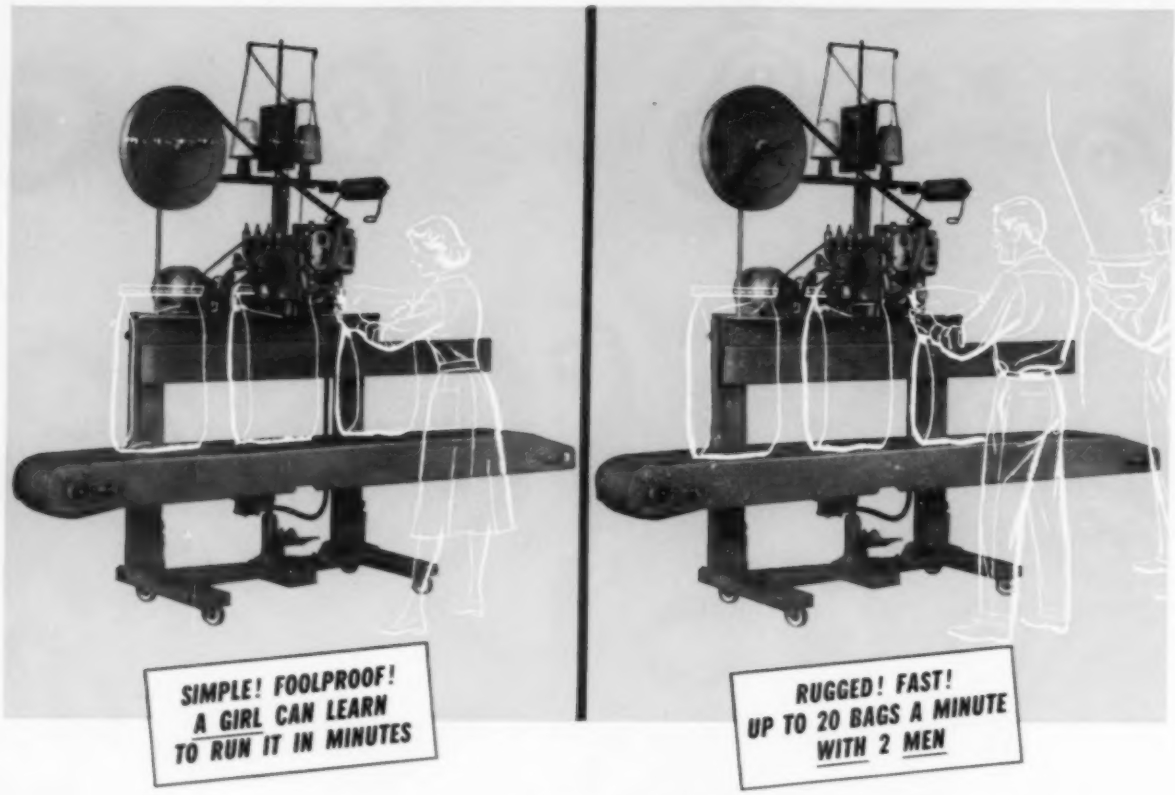


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- New Ammoniating Solutions
- Problems of the Manufacturer
- CACA Elects Elliott
- Launching A New Pesticide
- Fertilizer Safety Schools
- Dithane Patent Case

OCTOBER, 1958

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Precision-engineering brings you new Bagcloser 171.
The most efficiency and versatility for your production dollar.

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This Month's Cover

Pictures taken on Hercules tour of Mid-South cotton fields September 15, 16. Top: W. J. Godbold, manager of Eastland Plantation, Doddsville, Miss. compares cotton plant from field on early season program (left). K. P. Ewing on right is holding plant which did not receive the early insecticide protection. Bottom pic.: R. R. Coker, Coker's Pedigreed Seed Co., examines a heavily fruited stock from field on the early season program: Story on page 74.

Vol. 13, No. 10 October, 1958

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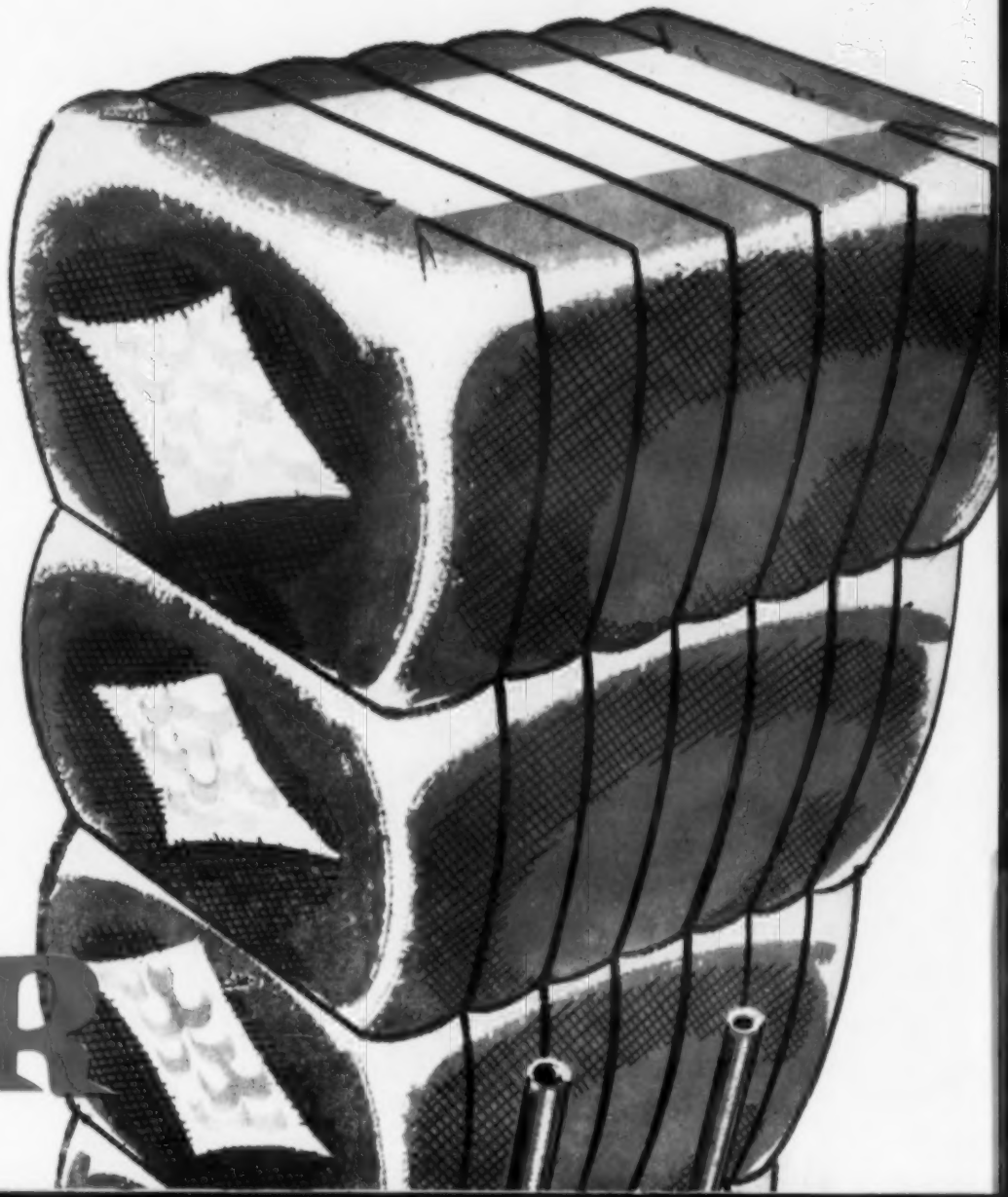
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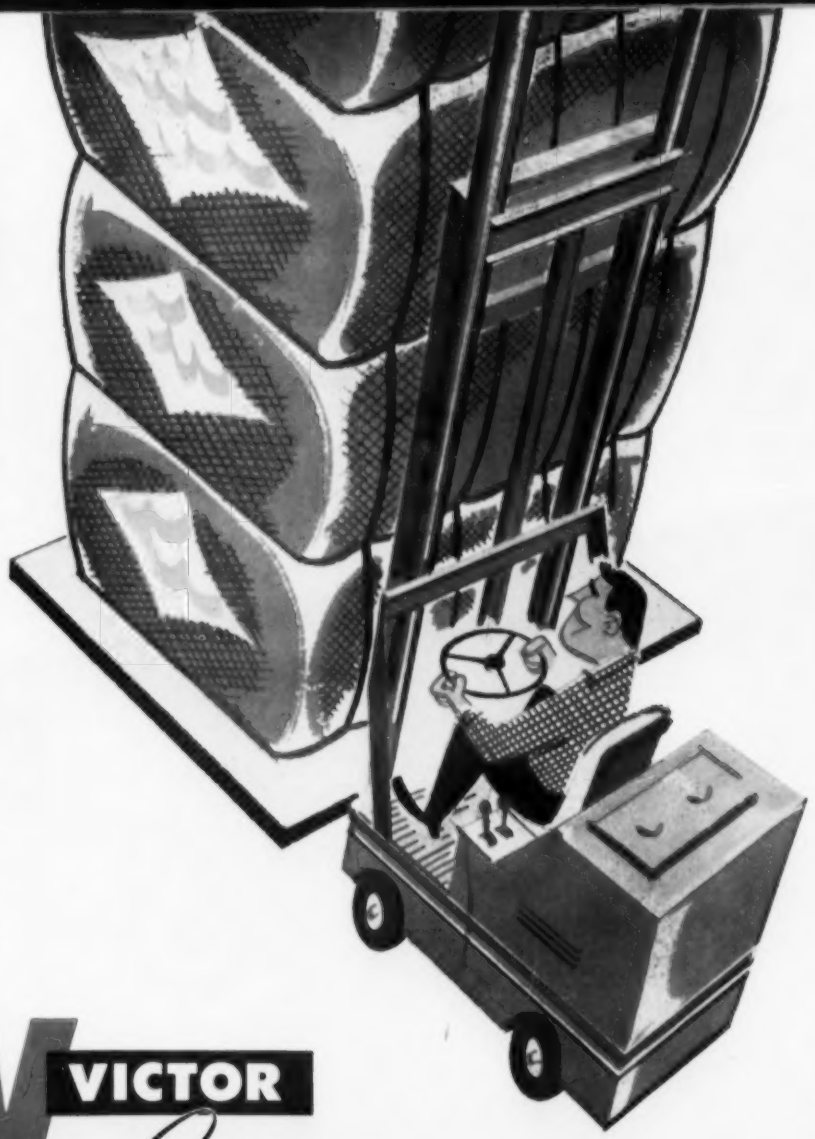
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METHYL PARATHION

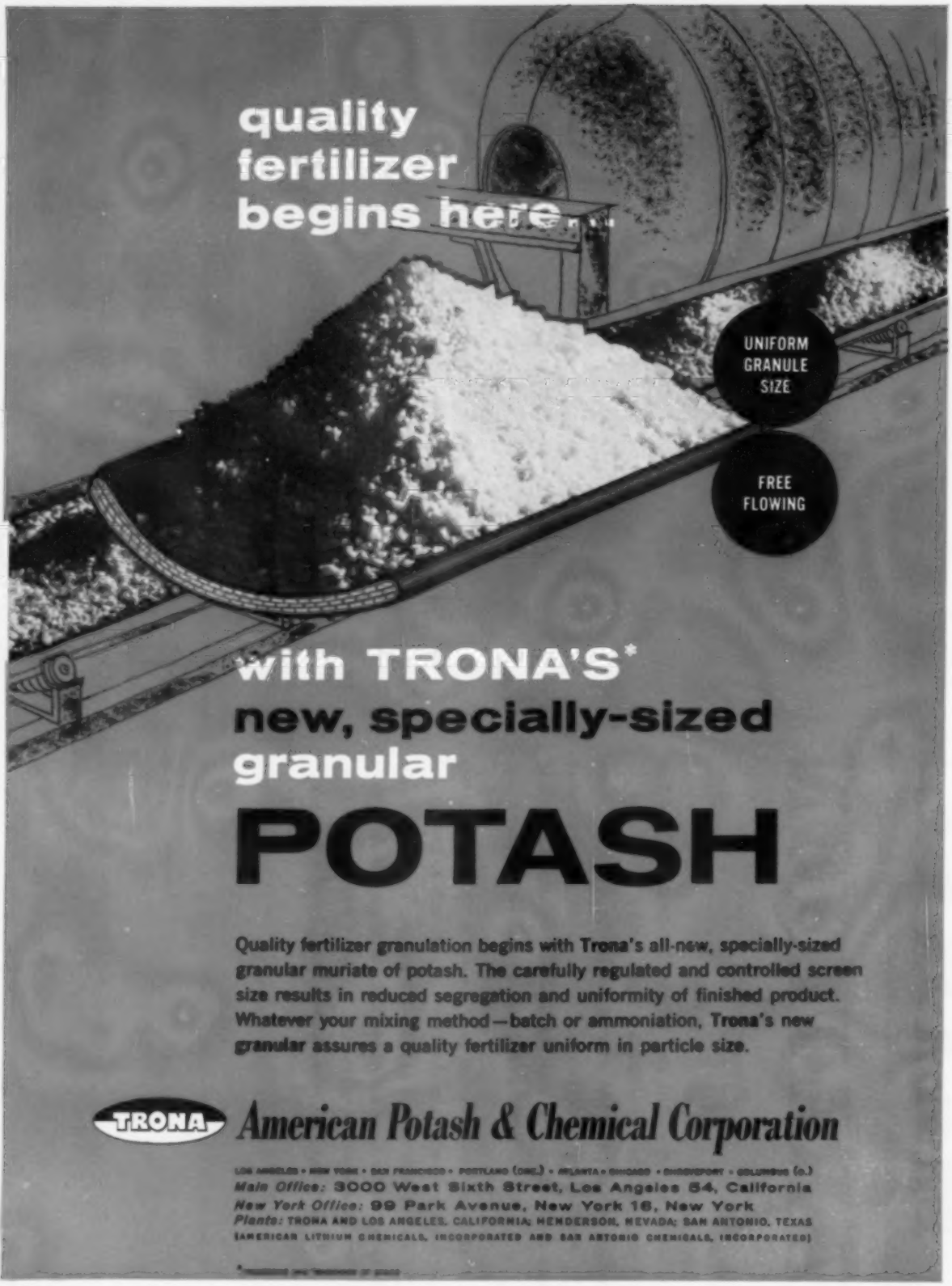
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new, specially-sized
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Won't Show up in Milk or Meat
Safer, More Effective Against "Resistant" Flies

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for Scottish Agricultural Industries Ltd....

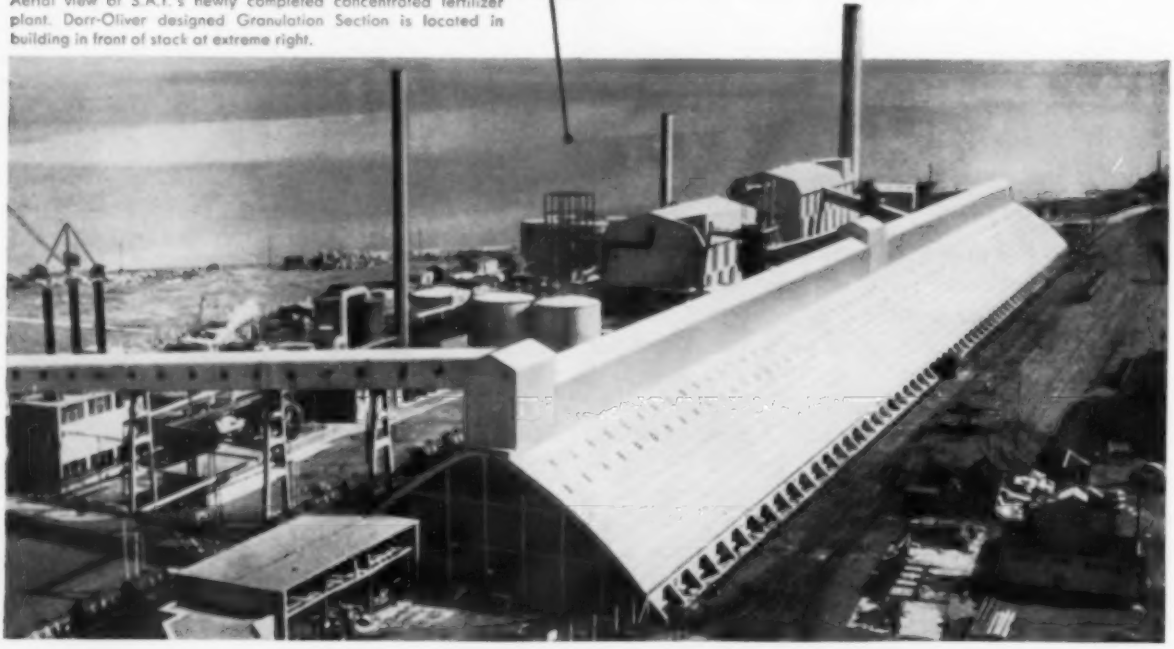
Granulation section designed by Dorr-Oliver Incorporated

On March 17, 1958, Scottish Agricultural Industries Ltd. inaugurated their new 8.5 million dollar plant at Leith, Scotland, for producing ammonium phosphate based complete granular fertilizers. The new Leith plant includes three main process units—sulfuric acid production, phosphoric acid production and a fertilizer production section. The fertilizer section, designed by Dorr-Oliver Incorporated, utilizes the world-wide accepted Dorrco Granular Fertilizer Process.

Dorr-Oliver Project Sales Division, with over 41 years' experience in the field of concentrated fertilizer production via the wet process of manufacturing phosphoric acid, is staffed by engineers qualified to handle all phases of fertilizer plant design — from benefication of phosphate rock through laboratory studies and economic evaluation, to supplying a complete plant regardless of size.

DORR-OLIVER
INCORPORATED
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STAMFORD • CONNECTICUT • U.S.A.

Aerial view of S.A.I.'s newly completed concentrated fertilizer plant. Dorr-Oliver designed Granulation Section is located in building in front of stack at extreme right.

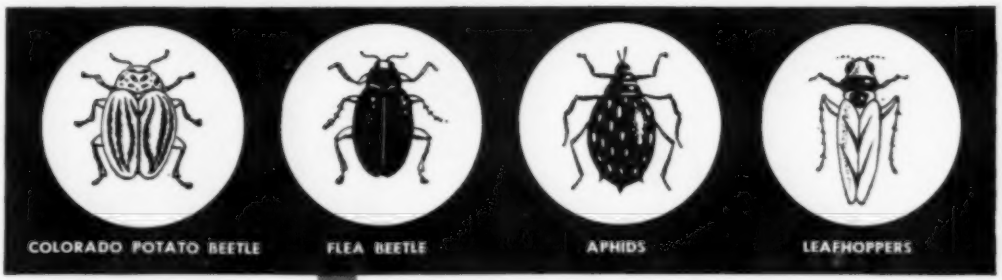


WHEN YOU BUY Magara YOU BUY PROTECTION

Thiodan

A Noteworthy New Broad Range Insecticide for Potatoes

kills 'em All!



NIAGARA POTATO FUNGICIDES OF PROVED EFFECTIVENESS

Niagara Nabam

An organic liquid fungicide, compatible with most insecticides. Controls many diseases, particularly early and late blight.

Niacide Z

A new organic potato fungicide containing zinc salts. Niacide Z gives exceptionally good control against early blight.

NIAGARA THIODAN GIVES ONE SHOT CONTROL OVER ALL COMMON POTATO PESTS

Thiodan is a name for potato growers to remember. It is an important new Niagara discovery. Thiodan provides broad range use and sure kill effectiveness against *all* potato insects. With Thiodan you get a multiple kill of several potato pests at the same time. This means new ease and convenience plus economy in protecting your crop.

Thiodan is easy to use. Just mix this concentrate with water at the rate of one quart per 100 gallons. Apply with ground spray equipment. And Thiodan is compatible in your spray tank with all commonly used potato fungicides. So be among the first to benefit from Niagara Thiodan. See your Niagara dealer, Niagara field man or write us.

Putting Ideas to Work

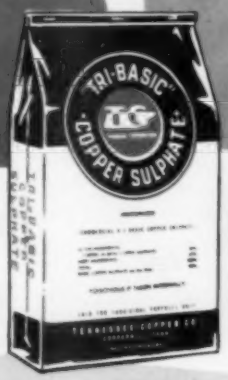
FOOD MACHINERY AND CHEMICAL CORPORATION
Niagara Chemical Division

MIDDLEPORT, N.Y., RICHMOND, CALIF., JACKSONVILLE, FLA., WYOMING, ILL., NEW ORLEANS, LA., AYER, MASS., HARLINGEN, TEXAS, YAKIMA, WASH., GREENVILLE, MISS.
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TRI-BASIC COPPER

Is there another Fungicide offering these advantages?

Longer Protection Easy to Apply	Corrects Copper Deficiencies	Effective Control Always Dependable
Upgrades Quality of Fruits & Vegetables	Economical Longer Shelf Life	Compatible Plentiful Supply

TRI-BASIC COPPER SULFATE
Quality Controlled from Mine to Finished Product

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TENNESSEE CORPORATION

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You can get experienced technical help in formulating a new nitrogen-containing fertilizer, or in bringing an old one up to date, just by calling Texaco. And you may avoid duplicating research that's already been done, because Texaco may have just the answer you need.

Whatever the prevailing soil conditions in your area, Texaco has the technicians and the facilities to help you to use nitrogen more profitably, and to produce a more effective and economical fertilizer.

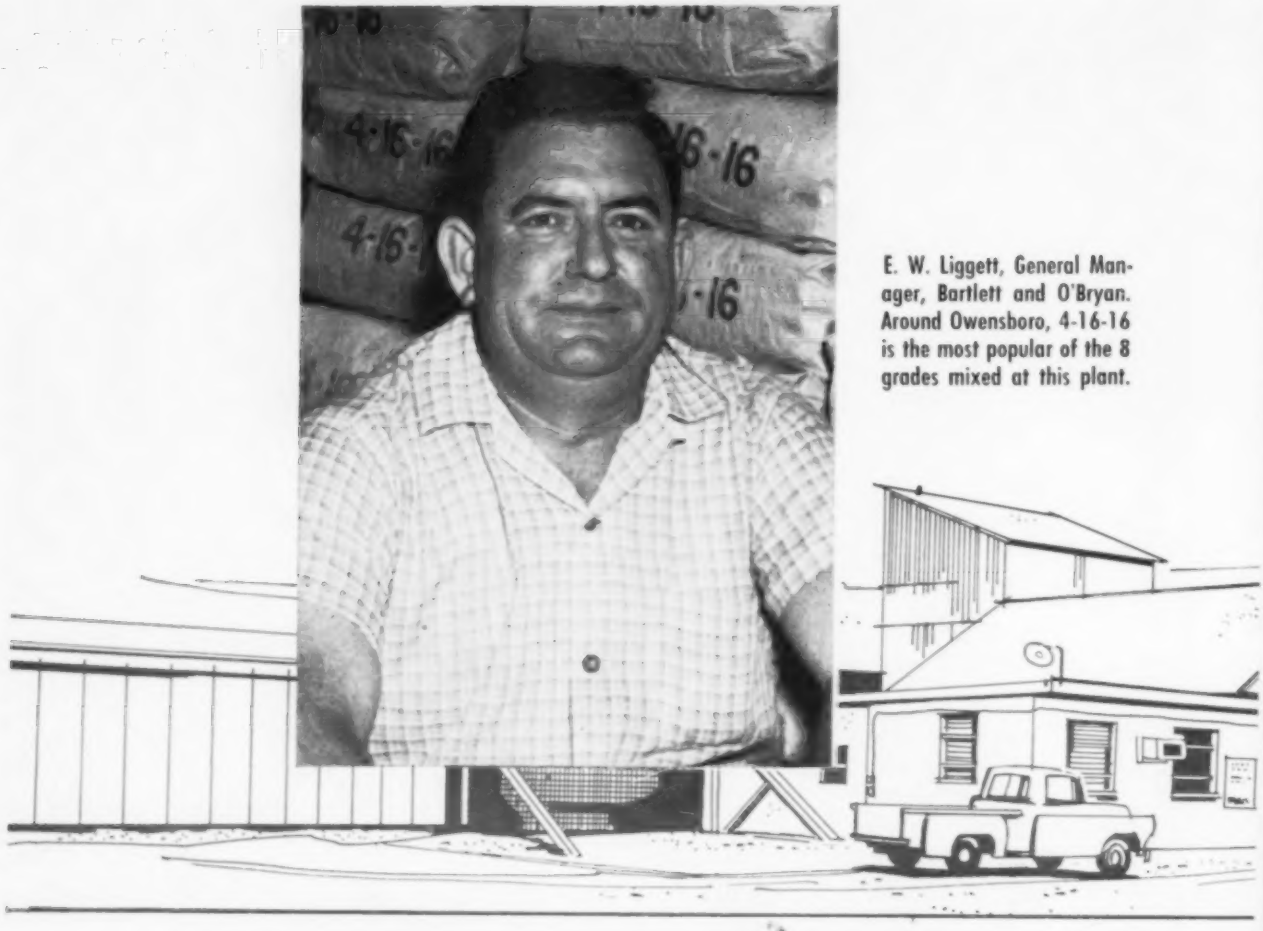
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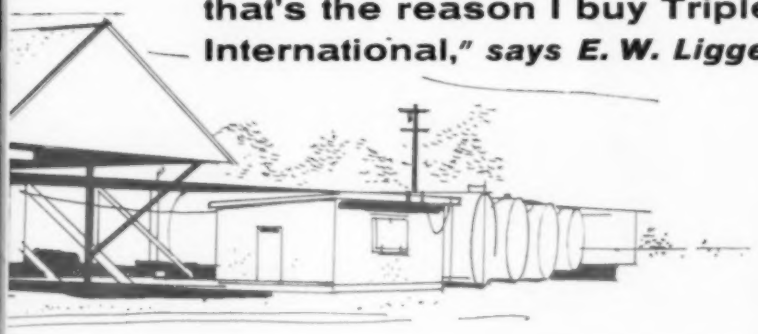
E. W. Liggett, General Manager, Bartlett and O'Bryan. Around Owensboro, 4-16-16 is the most popular of the 8 grades mixed at this plant.



In a 50 mile market around Owensboro . . .

International's product and service help keep a growing customer list sold on Bartlett and O'Bryan Fertilizer Co.

"Good product... good service... good people— that's the reason I buy Triple Super from International," *says E. W. Liggett, General Manager*





Free soil testing is a Bartlett and O'Bryan service. B&B furnishes the soil sample bag, sampler and information on how to take the sample. Soil testing reports are checked by Louis Haynes in the company laboratory.

"I believe in giving my customers top notch quality and good service, and naturally I expect the same from the people I buy from." The speaker, E. W. Liggett, who has been an International Triple Super customer for the last six years.

He continues, "We have been using International Triple Super Phosphates ever since we started in business. It ammoniates well, handles good and enables us to put out a high quality product. This plus excellent transportation service and technical help supplied by International makes me a very well satisfied customer."

Liggett believes in keeping customers talking and buying Bartlett and O'Bryan fertilizers. Among his customer-service favorites is an annual Bar-B-Q, attended last year by over 900 guests.

Bartlett and O'Bryan formulates 12,000 to 15,000 tons of dry-mixed, ammoniated-type fertilizer per year . . . in 8 different grades, principally for corn, soy beans and tobacco. They use coarse and run-of-pile IMC triples.

Your firm too can benefit from IMC Triple Super service. Write, wire or call for details.



E. W. Liggett checks out an order with driver Murray Roland. Bartlett and O'Bryan operates three 20-ton trucks for day and night service in a 50-mile radius.

Creators of Living Minerals

International MINERALS CHEMICALS

PHOSPHATE CHEMICALS DIVISION

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

Administrative Center: Skokie, Illinois

Welcome card



to buyers of Anhydrous Ammonia and Nitrogen Solutions

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1. This card is presented by a man from a company that backs up its salesmen's promises for delivery and for products that meet a customer's specifications.

2. The customer doing business with Standard Oil knows he is buying from a company with an established reputation . . . a company he knows will give him fair treatment, service and product quality.

3. Standard's modern Ammonia and Nitrogen Solutions plant is located in the heart of the country's largest rail- and truck-shipping area. To a customer this means fast, sure deliveries . . . deliveries that can be easily controlled because routes are direct and distances short.

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You expect more from STANDARD and get it!

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Then you're looking for a Bradley Pneumatic Hercules Mill. Because the Bradley Pneumatic Mill is installed on a foundation flush with the floor line, it not only reduces foundation costs but simplifies inspection and maintenance. Grinding parts are also easily accessible . . . both grinding die ring and roll assemblies can be removed without dismantling the mill. And the mill's durable, non-clogging vibratory feeder and electrical control eliminate manual feeding . . . allow continuous operation of the mill. Add rugged construction to this, and you have a mill which produces a uniform grind from 20 to 325 mesh with an absolute minimum of replacements and downtime.



BRADLEY PNEUMATIC HERCULES MILLS

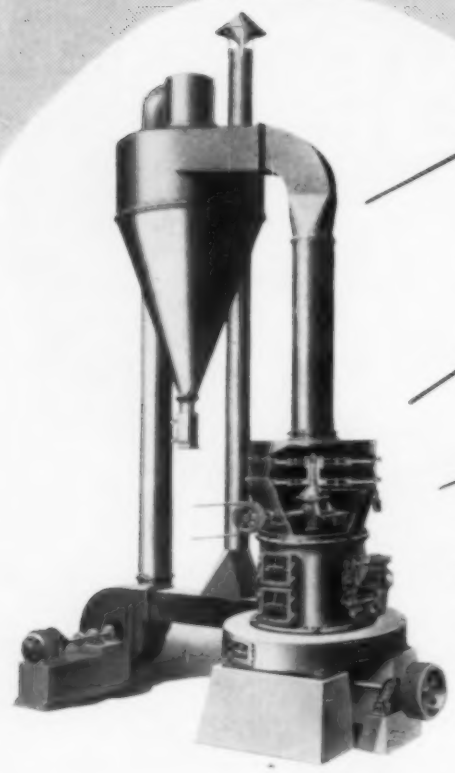
See Chemical Engineering Catalog or for complete information, write for Catalog No. 63

BRADLEY PULVERIZER CO. LONDON ALLENTOWN, PA. BOSTON

superior grinding equipment since 1891

RAYMOND *High-Efficiency* ROLLER MILLS

For All-Purpose Insecticide Grinding



CYCLONE COLLECTOR AND CONVEYOR PIPING

WHIZZER AIR SEPARATION

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These slow speed, cool running units give excellent results on certain materials which have a tendency to stick in grinding or blending. Build-ups are eliminated in the mill system, thus permitting long, continuous runs.

Ease of operation, economy in production and record low maintenance costs, are assured in using Raymond equipment. If you have a special grinding problem, write for further information.



RAYMOND BULLETIN No. 84 will be mailed on request, describing the Raymond line of insecticide grinding mills.

COMBUSTION ENGINEERING, INC.

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CHICAGO 22, ILLINOIS

Raymond Division

SALES OFFICES IN PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada

NOW you can formulate high concentrate wettable powders at low cost with MICRO-CEL



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Micro-Cel*, a new line of synthetic calcium silicates, has extremely high absorptive properties. It is this remarkable capacity for absorption that makes it possible to prepare wettable powders with higher concentrations of dry, viscous or liquid poisons. Micro-Cel's absorption also means that more lower cost diluents can be used. Thus high strength formulation costs are now cut to a new low.

REMAINS FREE-FLOWING—MEETS STORAGE TESTS

With Micro-Cel, these high concentrates will remain in a free-flowing state even after prolonged storage. This is particularly important in producing poisons for the export market.

In addition, suspension values after storage of 1.5 to 2.0 I.C.A. have been achieved in 75% DDT wettable powders, based on Micro-Cel. This is more than adequate for storage conditions encountered in most tropical countries.

DEVELOPED BY JOHNS-MANVILLE RESEARCH

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*Micro-Cel® is Johns-Manville's new absorbent-grinding aid designed specifically for the insecticide formulator.

Johns-Manville

MICRO-CEL

SYNTHETIC CALCIUM SILICATES

A PRODUCT OF THE CELITE DIVISION

Johns-Manville, Box 14 New York 16, N.Y.
In Canada: Port Credit, Ontario

Please send ☐ further information; ☐ samples of Micro-Cel. I am interested in using Micro-Cel with the following poisons:

_____

☐ Please have your local representative contact me.

Name_____ Position_____

Company_____

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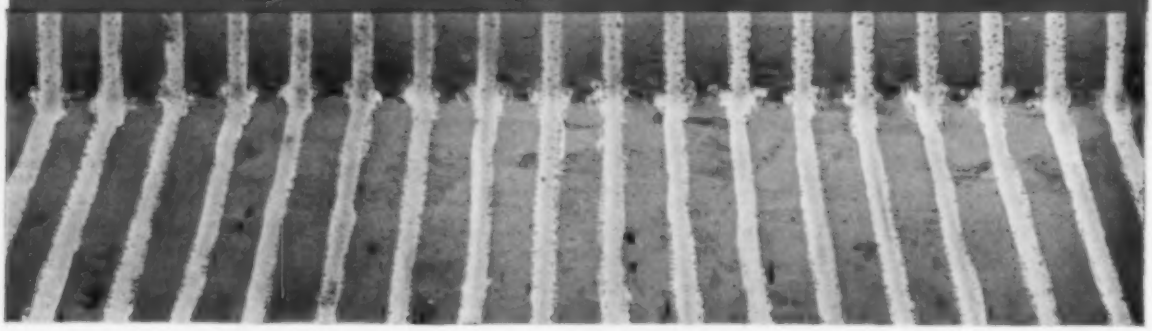


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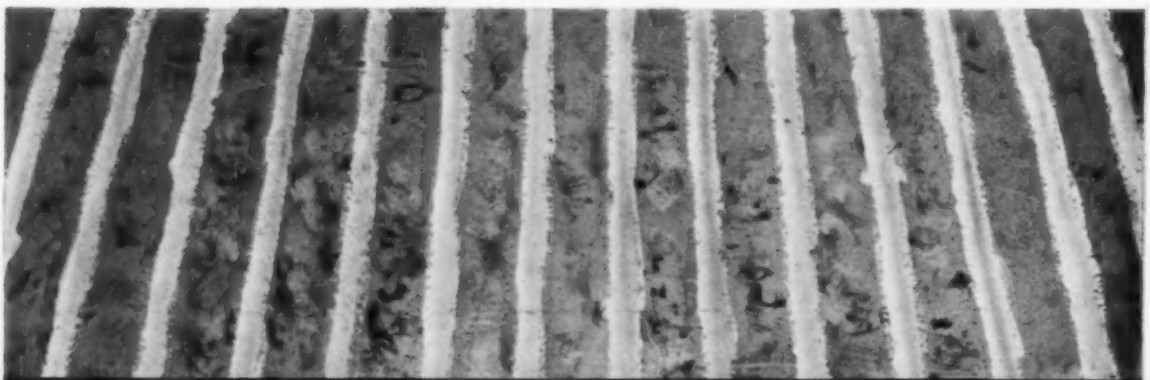
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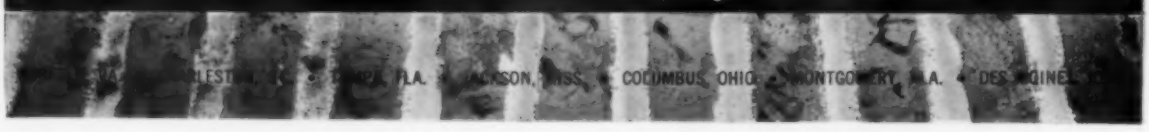


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Trade Listing

National Agricultural Chemicals Association. Association Building. 1145 19th St., N.W., Washington. D. C. Lea Hitchner, executive secretary.

National Plant Food Institute. 1700 K St., N. W., Washington, D. C. Paul Truitt and Russell Coleman, executive vice-presidents.

Regional Offices listed on page 123.

American Society of Agronomy. 2702 Monroe St., Madison Wisc. L. G. Monthey, executive secretary.

American Phytopathological Society. S. E. A. McCallan, secretary. Boyce Thompson Institute, Yonkers, N. Y.

American Chemical Society. 1155 16th St., N. W., Washington, D. C.

Association of Official Agricultural Chemists. P. O. Box 540. Benjamin Franklin Station, Washington, D. C., William Horwitz, secretary-treasurer.

Agricultural Ammonia Institute. Hotel Claridge, Room 305, Memphis, Tenn., Jack Criswell, executive vice president.

American Society of Agricultural Engineers. F. B. Lanham, secretary. 505 Pleasant St., St. Joseph, Mo.

Carolinas-Virginia Formulators Association. 516 S. Salisbury St., Raleigh, N. C. Hugh Horn, secretary-treasurer.

California Fertilizer Association. Sidney Bierly, executive secretary. Suite 1, Boothe Building, 475 Huntington Drive, San Marino California.

Chemical Specialty Manufacturers' Association. 110 East 42nd St., New York City. Dr. H. W. Hamilton, secretary.

Entomological Society of America. 1530 P. Street N. W., Washington D. C., R. H. Nelson, secretary.

Mid-West Soil Improvement Committee, 121 West Wacker Drive, Chicago 1, Ill. Z. H. Beers, executive-secretary.

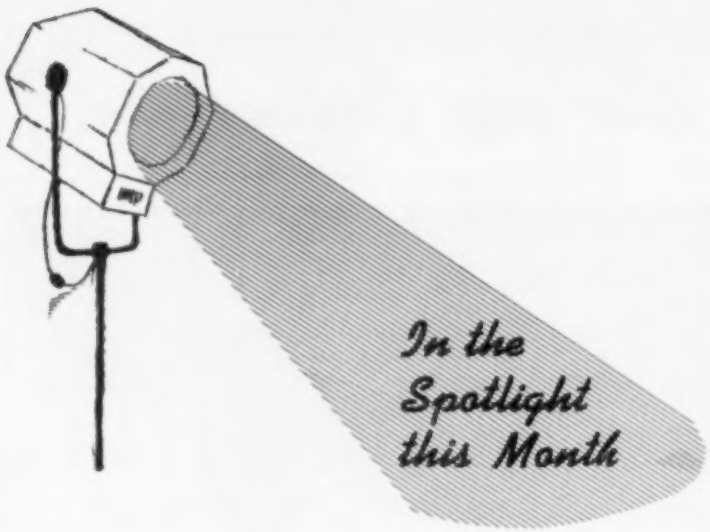
National Nitrogen Solutions Association. 2217 Tribune Tower, Chicago, Ill. M. F. Collie, secretary.

National Cotton Council. PO Box 9905, Memphis, Tenn.

Soil Science Society of America. 2702 Monroe St., Madison, Wisc. L. G. Monthey, executive secretary.

Weed Society of America. W. C. Shaw, secretary, Field Crops Research Branch, Beltsville, Md.

Western Agricultural Chemicals Association. Charles Barnard, executive secretary, 2466 Kenwood Ave., San Jose, Calif.



Soil Testing . . . A farmer using good soil testing service generally makes some change in his fertilizer use. He often shifts to grades better suited to his needs, even if he doesn't increase the amount of fertilizer applied. As he develops confidence in soil tests, he will follow the recommendations more closely. Page 51.

New Ammoniating Solution . . . Fertilizer mixers are offered two new solutions with low salting out temperatures and low free ammonia content, which make granulation practical regardless of weather conditions. Page 39.

Cost of Pesticide Development . . . Launching a new pesticide runs to $1,250,000, — and this does not include the investment in a plant, market studies, patent costs, publicity, advertising, and educational work. Dr. R. W. Wellman offers comments on the costs of developing a new pesticide. Page 42.

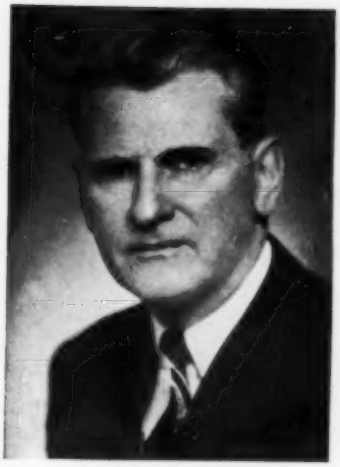
Closed Circuit Fertilizer Operation . . . Feature of the 100 ton/day fertilizer plant of Dayton Fertilizer Corp., is ease of production of special formulations, and facility in switching back to standard mixes with minimum delay. Page 40.

Problems of the Manufacturer . . . A candid analysis of the problems of the Canadian manufacturer and formulator of agricultural chemicals in trying to compete with non-Canadian suppliers for the $21 million dollar Canadian market. Page 37.

Fertilizer Safety Schools . . . Sponsored by the National Safety Council and NPFI, the safety training program completes its third year. Six schools held in 1958, emphasizing safety in fertilizer handling and production. Page 35.

Dithane Patent Case . . . *Agricultural Chemicals* gets the facts from Rohm & Haas and Roberts Chemicals on the Dithane patent infringement litigation. Page 45.

The '58 Market . . . Industry experts comment on '58 sales, pesticide uses, prices and distribution pattern. Summarizing: the season was late in getting started, but lasted late into September, with total sales for the season at top levels; home garden products, herbicides and other chemicals were an important factor in the '58 sales picture. Page 30.



A Message by NAC's president J. V. Vernon

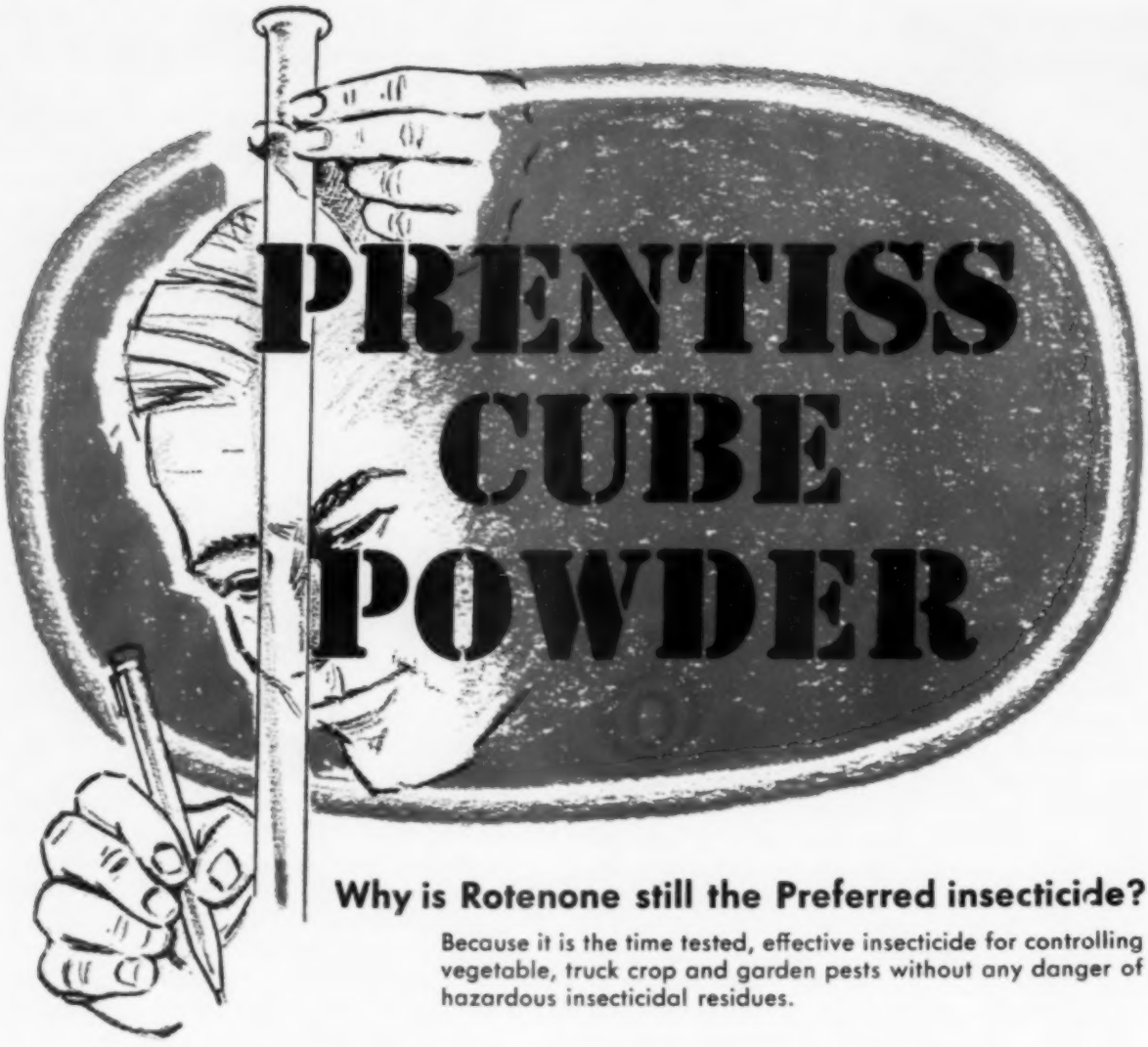
DURING the year 1958, severe insect infestation outbreaks of great economic importance have, with a few exceptions, been negligible. To achieve this record of minimum crop damage, the cooperative efforts of many people and organizations have been necessary. In this respect, I should like to compliment Federal and State authorities and county agricultural agents on their alertness and diligence. At the same time, the manufacturing industry and the applicators, aerial and other, have displayed a responsiveness without which these results would have been impossible. It appears that with industry ready and able to make available the proper toxicants at the right time, with Federal and State agents helping to determine where and when action is necessary, and with the applicators carrying out the job in a thorough manner, it is now practically impossible for serious infestations to get out of hand as they have in the past. The further continuation and expansion of this type of cooperation can only result in more effectively safeguarding the future of our Nation's agriculture.

In spite of the fine record to date, it should be recognized that there is yet much to be done. The extent of damage caused by plant pests is great — running into millions of dollars annually. In order to present all of the facts relating to the economic advantages of proper use of pesticides and to allay fears that may arise in the public mind, a good sound educational program is needed. Such a program must be a combined effort on the part of industrial, Federal, State and various agricultural organizations. On behalf of the industry, the NACA is planning such a program for 1959. I would like to recommend to representatives of other groups mentioned above that they also make a concerted and strenuous effort to establish and carry out such an educational publicity program for the coming year.

I believe I can safely state that our industry has fared a little better in 1958 than it did last year. However, there are specific situations where certain of our products for use in localized areas have not come up to volume reached last year or perhaps anticipated this year by the manufacturer. In our kind of business this is not an unusual situation. Much has been said about the generally improved financial conditions in American agriculture. This is true for certain segments, but in other areas it is not true. One would probably deduce that if agriculture as a whole shows financial improvement, then it should follow that the pesticide industry serving agriculture should also have improved its financial condition. Again this is not necessarily true since it all depends on whether or not the products of our industry are needed in the areas where these improvements are shown.

Our industry is spending many millions of dollars on research for the future usefulness of agriculture, improving plant facilities, building new ones, gambling that infestations will occur and weather conditions will be favorable for good crop growth in the succeeding year. Yet with all these uncertain and unknown elements entering the picture, the return on investment is much, much too low and below the average for many other kinds of industries. In short, the risks involved call for greater return if the industry is to successfully combat the crises inherent in our business.

In order to continue to serve adequately our important customer, Agriculture, it is quite necessary that cost reduction programs be continually examined. More efficient methods of production must be adopted, more effective products must be developed in order that an improvement in the return on invested capital can be made. Considering all the hazards and uncertainties of doing business in this industry, I feel I would be remiss in not calling attention to this important phase of our business. If we are to have a healthy dynamic growth type industry to meet the challenge of being prepared at all times with food and fiber for the welfare of our people here at home, our friendly allies in foreign lands and in defense against the Communist doctrine, we must adopt those policies, procedures and business practices which are necessary to the accomplishment of these goals.★★



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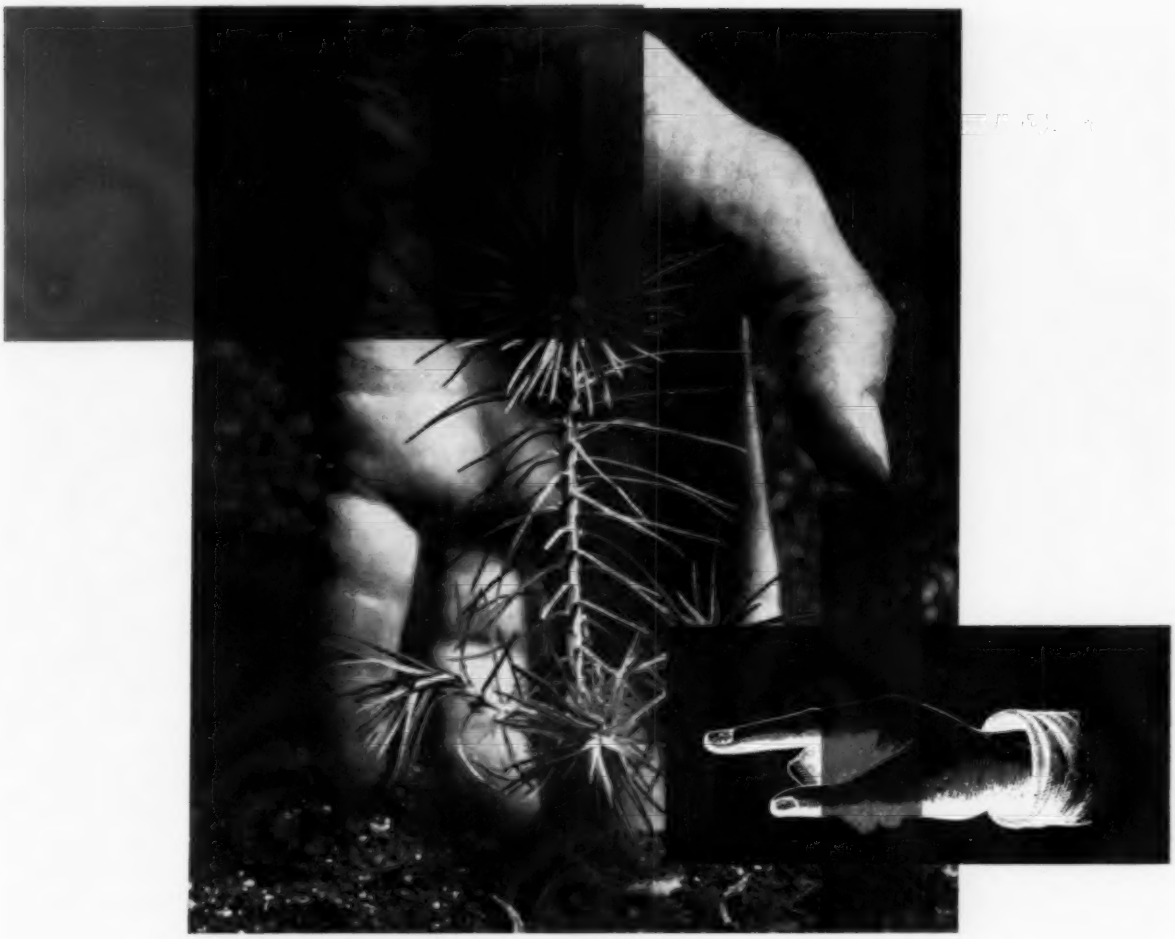
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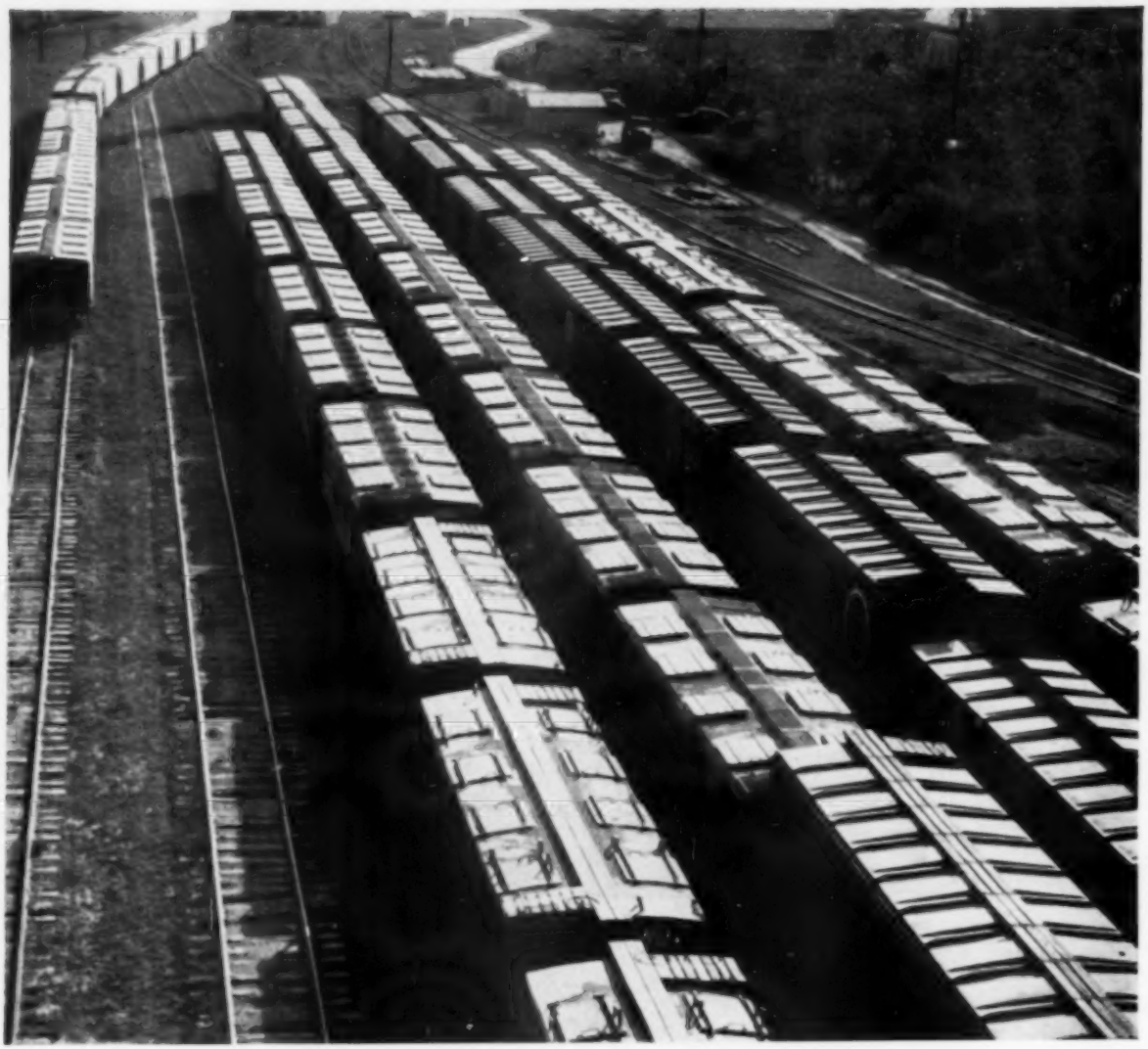
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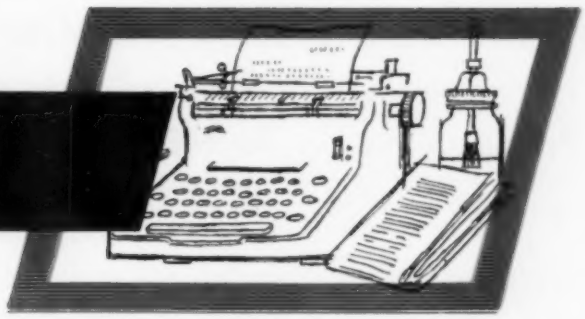
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EDITORIALS



REPORTS from the front line, summarized in this issue, (Pgs. 30-34) suggest that, on the whole, business has been rather good for those in the pesticide field this season. Admittedly the year got off to a poor start. The growing pattern was delayed by unfavorable weather early in the year, sales to the citrus industry were sharply reduced, and there was a big drop in volume of pesticides used in the cotton belt because of low weevil populations and reduced acreage. These influences, however, were more than offset by increased demand for pesticides for late-season application and for a number of new uses. Consumption of pesticides was heavier than normal on truck and fruit crops, tobacco, etc.; a big grasshopper infestation stimulated demand from the affected areas; the home garden market continued to expand; wet weather stimulated fungicide sales in many areas; herbicides moved ahead to record consumption levels; and a number of new products such as defoliants, growth stimulants, nematocides and systemic livestock pesticides helped expand the market for specialty applications.

The reports on this season's new products are particularly encouraging, indicating as they do the possibility of an expanding market for pesticides in the years ahead as more and more specialty products are developed to do specific jobs. And, as might be expected, the price pattern has been much more favorable on these specialty products. Growers seem disinclined to quibble about price tags, and marketers have been able, on the specialties at least, to avoid the cut throat competition which, over the years, always seems to beat down the price of staple pesticides such as calcium arsenate, DDT, BHC, etc., to the point where no one made a profit on them — and no one wanted to handle them. Let's have no more such industry footballs!

In spite of the tremendous cost of research today, it is apparent that new and better pesticides are being discovered and introduced. In them we see a real opportunity for the industry to offer the consumer improved performance in pest control, — and at the same time to recover a more adequate return on its investment.

THE tremendous cost of researching a new product and bringing it on the market are reviewed elsewhere in this issue (Pg. 42). A well versed authority points out that it costs upwards of a million dollars to bring a new product to the dealer's shelves. But why, after having made this big investment, do so many companies fall down on the essential follow-up job of telling the distribution and advisory channels all about their expensive new babies?

We can name two dozen pesticide innovations of the past few seasons that have been launched with enthusiasm, and then left to flounder around by themselves with almost no follow-up advertising or educational programs. Perhaps some advertising is done direct to the end user, but far too often almost no concerted effort is made to get the story on the new material across to the real professionals in the pesticide field, — the formulators, the big dealers and distributors, the entomologists, experiment stations, county agents and extension services, whose recommendations are so vital, and whose advice carries so much weight with the end user.

If it was us, and we had a million bucks invested in a new product, like the man says, we would certainly insure our bet with another ten

(*Continued on Page* 138)

'58 to show greatest dollar volume of ag. chemicals in spite of slow start. Prices unsteady in NE on volume sales

P. S. Catir
Eastern State Farmers Exchange
New York

WITH the coming of fall and harvesting, 1958 is all but in the record books with respect to the northeast region served by Eastern States Farmers' Exchange. Our 1958 crystal ball is soon due for replacement by a bigger and better 1959 model—and the time is right for recapping the past usage season, while the good and the bad are well in mind.

The advent of spring was a painful and agonizing process, with low temperatures and excessive rainfall holding back major crop development. Agricultural chemical inventories, strategically placed throughout our nine state operational area, loomed larger with the passing of each cold, wet week. Sales figures through May lagged appreciably behind the same period last year. As June came on, crops, insects, diseases and pesticides all embarked on a surge which continued through the balance of the summer. During each of the months of June, July and August, Eastern States sales of agricultural chemicals surpassed the corresponding months of 1957.

It now appears that Eastern States will distribute its largest annual dollar volume of agricultural chemicals during 1958. Distribution of liquid materials is greater than in any previous year, while tons of dry chemicals are at the highest level since the early 1950's prior to the swing to liquids and/or concentrated materials.

The greatest single factor involved in the 1958 season has been the weather. Adverse weather in the early months directly affected price patterns, evidenced by the numerous instances of depressed and demoralized prices being offered by several firms to growers throughout the northeast region on certain volume products.

Another aspect of this perennial problem of pricing showed itself in many sections through erratic quotataions on specialized materials of limited demand in this area. Although there has been some progress toward orderly marketing on several commodities, the edge has been taken off this by the backsliding on others. The correction of this, by the careful selection and categorizing of distributors, dealers and growers by their true function, is still ahead for the industry, and accomplishment of the same will mark the transition from adolescence to maturity for the industry.

This 1958 season has seen several changes in overall distribution figures. Forage crop spraying, disrupted by spring weather, was below last year. Herbicide applications in all phases surged ahead to a record gallonage total. Fruit fungicide shipments surpassed past records. Vegetable and potato crops, plagued by both insects and diseases to an abnormal degree, required increased tonnages of pesticides.

A greater number of dealer-level distribution points in the field, coupled with the increased demand, resulted in a larger average inventory being carried during the past year.

Among the newer pesticides included in the Eastern States program in 1958, several appear to be headed for wider usage in the future.

Vapam is a real "comer" for use in seed bed preparation. Its wider usage is, we believe, currently somewhat limited by the cost factor.

Dalapon has proven its worth and appears to be due for a wider demand next year. In the northeast, this demand will show itself mostly in fall applications for quack grass control, since the safe time period necessary between application and spring planting limits spring use in these "late" states.

Amino Triazole appears to be satisfactory for control of poison ivy, milkweed and thistle and has been enthusiastically acclaimed by the cranberry growers for control of asters, panic grass, white violet and possibly others.

Maleic Hydrazide, in a liquid formulation, is adequately replacing the dry form as a sprout inhibitor with increased interest by potato growers for this use. Its acceptance as a sucker inhibitor on field grown tobacco has been very considerable in the Middle Atlantic area.

REVIEWING '58

Maneb has experienced an excellent acceptance by many potato growers for the control of late blight, replacing Nabam.

Thiram, for control of disease on fruit, has experienced greater distribution through Eastern States than in 1957, but no wide change-over to this product is yet discernible.

Diazinon 25-E has been the leading fly control material during 1958, but reports of resistance development may retard distribution in the future.

Diazinon WP used in this area shows apparently good control of apple insects.

Guthion WP, although grower introduction was seriously hampered by short supply this past season, gives in-

(*Continued on Page* 129)

Pesticide Sales

Disruption of published price structure a threat to the Distribution System— '58 sales up, but cooperation needed

J. F. Hanley
Cooperative Seed & Farm Supply Service
Richmond, Va.

I ENDED my comments for the June issue of AGRICULTURAL CHEMICALS with the following sentence:

"What will prices be like in the future if the weather breaks and the consumer begins spraying or dusting for control of insects, fungi or weeds?! Only time will tell!!!"

Time *has* told the story. The so-called 1958 Growing Season has recently been completed. It is rather amazing, to one involved in the distribution of agricultural chemicals, to note, that when a product is in demand, stability of price structure is forgotten. To the distributor, this presents a very serious problem. Should he continue to purchase these competitive products, process them through his distribution system and find after he has sold the product that other distributors and/or formulators have disrupted the manufacturer's published price structure?

This year, we saw very vividly through our operating territory, an example of the above. We were assured, as distributors of a new chemical, that the price structure on this particular product would be adhered to by all recognized distributors. The chemical was widely accepted by tobacco growers. For unknown reasons, the published price structure was disrupted. From then on to the completion of the Growing Season, we were in a state of chaos regarding distributor, dealer and consumer prices on this product. True, this chemical was well accepted during the past Growing Season; however, we as distributors will have to discuss this product in detail next year before purchasing any of it for distribution.

Even in view of other unpredictable price breaks on agricultural chemicals during the past Growing Season, we in Cooperative Seed & Farm Supply did enjoy an increase in volume on agricultural chemicals throughout the states in which we operate. Our operating territory includes Delaware, Maryland, Virginia, West Virginia, Kentucky and the Eastern part of Tennessee. All of our nine wholesale branches realized an increase in volume on all types of agricultural chemicals. I could not single out any one product as being a leader.

The commercial farmer, I believe, is aware of the benefits derived from using agricultural chemicals. I have been impressed, however, with the interest in the so-called Home and Garden Line of chemicals by the average suburbanite. This particular individual takes great pride in making his home the show place in his community. There is a great potential in this type of business. The average published price structure is adhered to. We as distributors find we realize a higher margin on the items processed through the Home and Garden Line when compared with the commercial agricultural chemicals.

(*Continued on Page* 129)

Apple and peach crop largest in ten years winter freezes reduce sales to citrus grower

S. H. Bear
Niagara Chemical Division, FMC
Middleport, New York

Sales Volume

SALES volume of agricultural pesticides during the '58 season to date has been about equal to earlier expectations, and normal. The apple crop of 126 million bushels is the largest since 1949. The peach crop of 76.5 million bushels is the largest since 1947. Both of these crops consume a substantial portion of the total market requirements for pesticides.

Vegetable crops, in general, have been normal or slightly above normal in size. Consumption of pesticides to grow these crops has been in the same proportions.

Cotton, another important pesticide consumer, because of acreage control and because of acreage diversion to the soil bank, consumed sub-normal amounts of pesticides.

Sales to the citrus industry were substantially reduced by the winter freezes in Florida. California consumption was about normal.

(*Continued on Page* 127)

Record Grasshopper Infestation Ups Pesticide Sales

James Lawler
Shell Chemical Corporation
New York

THE 1958 pesticide sales season was unique in that most of the activity was concentrated into a brief few months. The season was late in getting started due to excessive rains in the spring, and then was cut short in many sections of the country by extended rainy periods during the summer. The period during which sales occurred, however, was highly active and resulted in a favorable volume.

An unexpected insecticide offtake occurred when a record infestation of grasshoppers developed in the Plains states; but offsetting this, the low infestation of boll weevils curtailed sales in the Cotton South.

New products were well received in 1958, due primarily to their performance. Other factors contributing to their acceptance included a better understanding of the products through educational programs and the experiences of other users. A series of Nematology Workshops sponsored by Shell Chemical Corporation throughout the country contributed to growers' understanding of nematodes and their control and resulted in an increased use of soil fumigants. With the increased use of nematocides, our products received their due share of attention.

Aside from the soil fumigant
(*Continued on Page* 127)

Cotton Market Loss Offset by Sales for Corn, Tobacco

William Peele
W. R. Peele Company
Raleigh, N. C.

SINCE we are in the heart of the world's foremost tobacco producing area, naturally the big portion of our total sales volume of pesticides goes into the production of tobacco. Although tobacco is a fast maturing crop, once it gets in the field in the growing stage, the long drawn out procedure of growing tobacco starts in the late fall and runs through August which gives us about ten months of active sales of pesticides for tobacco. Tobacco is a very lucrative crop to the growers on a per dollar per acre basis of income, although acreage allotments are very small to thousands of farmers. Growing conditions in the entire tobacco area which we cover, which is in Virginia, North Carolina, South Carolina, Georgia, Florida, Tennessee, and Kentucky, have been most favorable, and farmers in this area produced almost a perfect crop this year.

Tobacco growers have found a tremendous return by the use of pesticides: methyl bromide, in preparation of their seed beds; field soil fumigants for the control of nematodes; granular insecticides recommended to control soil insects and a host of other chemical pesticides for control of insects attacking the plant after it reaches the field and growth stage. MH-30 has been one of the most widely accepted chemicals the past two or three years to stop the growth of suckers, taking the place of scarce and high priced hand labor.

In the area mentioned above, a sizeable amount of pesticides is used on truck crops, such as potatoes, beans, sweet corn, peaches, cabbage, tomatoes, and a host of others. Climatic conditions and unfavorable harvesting periods have made some of these truck crops very unprofitable to the growers this year. The acreage of cotton has steadily gone down in this particular area for the past several years, which has affected the sale of cotton pesticides accordingly. Production of corn, wheat, soy beans, and other small grains has been on the increase, and we find that the growers are more interested in pesticides for the control of insects affecting these crops. This has helped considerably to offset the major losses we have had in cotton pesticides.

Our business has increased in sales during the 1958 season about

(*Continued on Page* 127)

Profit on Sales Not Commensurate With Risk

Jack Tayler
Taylor Chemical Co.
Aberdeen, N. C.

THE 1958 season for agricultural chemicals is approaching its end, and we find that the year has been fairly good with the exception of a little rougher competition than we would like. As a pesticide industry we have only ourselves to blame for the unusual amount of price cutting that we have experienced. While we are making a profit it is not commensurate with the risks and efforts involved.

We find that there continues to be a flow of newer and better controls, and our customers continue to want the newest products, provided they are economically sound.

We think the pesticide industry has a great future, and when we outgrow some of our faults we expect to enjoy some of its profits. During the last year in the cotton south, the low bug count plus the amount of cotton put in the soil bank naturally discouraged the demand, and with sales going down, competition fought for every pound of business, which ended up by some products being too cheap to be profitable. We are expecting a better demand next year which will help stabilize the market.★★

Cotton South Reports Drop in Pesticide Sales

Jim Conner
Champion Chemical Co.
Canton, Miss.

THE over-all demand in this area of the "Cotton" South was somewhat below normal due primarily to low populations of boll weevils in most sections, coupled with the decreased cotton acreage due to participation in the Soil Bank.

These two factors plus high volume production facilities contributed to a depressed selling market. Consequently, the volume was below normal and profits either short or non-existent.

As would be expected under these conditions, new products and new practices were accepted by a few people but were examined closely. Costs were compared and advertising claims more closely scrutinized. Under these conditions, this was not the year to expect miracles with either old products or new ones.★★

Chlorinated Pesticides Back on Cotton Pest List

George Williamson
Agricultural Chemical Service Co.
Montgomery, Ala.

THE 1958 season was particularly interesting to us, because it presented a revival of the combination of two chlorinated hydrocarbons which were introduced to our area ten or twelve years ago without much acceptance. The revival of this combination insecticide for cotton was brought about by field demonstrations and promotion by the producer of one of the basic chemicals in disproving the resistant boll weevil talk which has been built up during the last several years. Growers acceptance of this new product, or rather the revival of the old product, was understandable since growers were as reluctant as industry in admitting resistance, and were anxious to cooperate in disproving the theory.

Dispelling the resistance theory does not mean there was no place in the picture for the newer insecticides. Very much to the contrary, we found special places for practically all the newer insecticides, which did outstanding jobs when used for particular problems.

(Continued on Page 127)

Volume of Sales Down—Prices Hold Own

Ivor Burden
United Heckathorn
Richmond, California

VOLUME of pesticide sales in the west, particularly in California, was lower than in 1957. Spring and early summer sales volume was off considerably due to one of the heaviest rainy winters and spring on record. Late summer infestations, particularly cotton bollworm and spotted alfalfa aphid, were extremely light in California. Arizona experienced a good season due to heavy outbreaks of cotton leaf perforator and loopers on vegetable crops. In the Pacific Northwest, weed killer sales volume was normal and there were increased sales of phosphates and DDT on fruit and peas due to a prolonged dry spell and exceptionally high summer temperatures. Almost twice the number of DDT sprays were necessary to control codling moth in the Yakima and Wenatchee fruit sections.

On the whole, prices held up fairly well throughout the west, with some lower prices in the San Joaquin Valley of California. The introduction and sale of many new pesticides during 1958 tended to up-grade price levels.

New organic phosphates were available in good volume during 1958 and played an important part in the market. Residual phosphates such as Trithion and Guthion gave good multi-purpose control of fruit insects with one early season application. Ethion and Trithion looked good for the control of insects and mites on alfalfa, cotton, beans and melons.

Tedion a new chlorinated hydrocarbon miticide gave exceptionally long residual control of mites on citrus. Kelthane, another non-phosphate miticide was used widely in summer sprays on fruit and field crops with good success.

Sevin, a new carbamate insecticide showed up very well in codling moth control, and appeared to be an outstanding insecticide for grape pest control, giving excellent control of grape leafhoppers and leaf folders.

Dialox, a new organic phosphate available this year in limited quantities, gave good control of cotton leaf perforator and excellent control of army worm on field crops.

The first commercial sales of gibberellic acid gave better size and quality on shipping grapes with resultant higher market prices.

A new livestock systemic phosphate insecticide, Co-Ral, was introduced this season for the control of cattle grubs, screworm and hornflies. Early performance reports are very encouraging. Korlan, a residual phosphate fly killer gave excellent results during initial sales.

In the herbicide market, Dowpon continued to enjoy a good sales volume for grass control. A new soil sterilant, Simazin, had good acceptance, and herbicides containing benzoic acid were moving in carload lots for the control of deep-rooted perennial weeds such as morning glory and knapweed.

In the cotton defoliant field, magnesium chlorate continued to

enjoy most of the market. Two systemic defoliants, Def and Folex, introduced last fall did not live up to expectations, and more development work particularly on dosage and timing, appears desirable. In the dessicant field, an increased volume of dinitros was sold, for application particularly on legumes.

Grower acceptance in 1958 of a large number of new pesticides on the whole was excellent. The progressive nature of Western growers lends itself well to the rapid introduction of new worthwhile pesticides.★★

New Chemicals Perform Well in '58 Application

H. F. Tomasek
Chemagro Corporation
New York

THE early part of 1958 was marked by abnormal weather in many parts of the United States which interfered seriously with, or badly delayed plantings of crops beyond normal times. As a result of this, emerging or hatching insects found an unnatural environment, with resulting low survivals and populations.

In the Delta, as an example, boll weevil counts were unusually low and never developed to the levels expected by insecticide producers. Methyl parathion which was in good early supply, became a glut on the market as a result of weak demand, and as would be expected in a public domain product, prices deteriorated rather badly.

There was a bright side to the picture, however, among the Chemagro products which stemmed from the research of Farbenfabriken Bayer A.G. Some of these products

(*Continued on Page* 125)

Consignment Selling Discontinued in Midwest

R. S. Thompson
Thompson-Hayward Chemical Co.
Kansas City, Mo.

THE 1958 season just closed was one in which orderly marketing procedures were followed for the first time in certain areas, in particular the North Central Area. Spring sales, although late in developing because of cold wet weather were extremely heavy during May and June, but slowed drastically during July and August.

Weed killers sold particularly well during May and the first two weeks in June. Sales began to drop off in the latter part of June and all of July, because of heavy rains throughout the midwest. Chemicals for grasshopper control moved extremely well during June in Western Kansas, Colorado, and Western Nebraska.

We feel that the discontinuance of consignment in the Midwest during 1958 has been the biggest accomplishment made in the marketing of agricultural chemicals in the last several years.

New products have been accepted very well, and our company, as well as many others, are devoting more time to the sale of specialty products for the agricultural market. Properly handled, this field can be profitable for the jobber and formulator as well.★★

New Uses Expand '58 Market for Pesticides

William Plowden
Geigy Chemical Co.
New York

IN the June issue of *Agricultural Chemicals*, a fellow member of our company, Mr. L. G. Gemmell, wrote:

> "Based on our early season experience, we are certainly optimistic on sales prospects for the balance of the year."

As the 1958 insecticide season draws to a close, we must say that our experience to date justifies Mr. Gemmell's expression of confidence at that time.

DDT moved in substantial quantities to formulators during the first quarter of 1958, and continued through the second quarter. Due to heavy government and export purchasing, and due to the fact that for the first time in a number of years domestic demand for DDT continued strong through August and into September, supply and demand have been reasonably well balanced.

With new uses accepted for our product, *Diazinon*, we have been able to move large quantities into Florida for use on tomatoes to control serpentine leaf miner.

(*Continued on Page* 139)

P. J. Reno, Hercules Powder Co., Wilmington, Dela., comments on the '58 sales picture on page 98.

Old Established Chemicals Preferred in '58 Buying

Silas Besthoff
Faesy & Besthoff, Inc.
New York

IN our opinion, prudence has been the dominant characteristic in this year's purchasing. Buyers have had a very healthy regard for the conditions of their inventories; for consumer trends; and generally speaking, for their ability to pay for what they bought. New products will always attract some buyers but it has been our observation this year that the better known, old, established materials were preferred. Sales tonnage and collections probably have been a little bit better than originally anticipated and cautious optimism for the future seems justified.

It is to be hoped that "profit conscious merchandising" will exert increasing stability on the present badly demoralized price structure.★★

Safety in Fertilizer Production Theme of N.S.C. Training Schools

By H. H. Slawson

THE accident prevention movement in the fertilizer manufacturing industry has been given a tremendous forward push through a series of training schools for safety supervisors conducted by the National Safety Council's fertilizer section, with cooperation from the National Plant Food Institute and department specialists on the NSC staff.

Although this extremely practical safety training program has been under way for three years, its significance as a powerful influence in accident prevention has, as yet, escaped general public attention and appreciation. It is the only training program of its kind anywhere among the 4 industrial areas served by the NSC, but Council officers are said to be giving thought to initiation of similar training schools among the other 39 industrial sections.

Three years ago, when Curtis Cox of V-C Chemicals was general chairman of the fertilizer section, an experimental school was conducted at Wilmington, N. C. It proved so successful that it was repeated last year. This led to the decision by the section's executive committee to expand the project to national proportions this year.

Three schools have been held so far in 1958, as follows: For the northeastern region at Ithaca,N.Y., Aug. 15-16; for the southeastern region at Atlanta, Ga., Sept. 10-11; and for the midwest region at Chicago, Sept. 10-11. Two others are still to be held this year, one at Austin, Texas., for the southwestern region, on an, as yet, unspecified date in November, and the final school at San Francisco, still later.

Overall direction of the various schools is in the hands of the fertilizer section's general chairman, George F. Dietz, safety director, Consumers Manufacturing Cooperative, Baltimore, Md., and the vice chairman, George L. Pelton, personnel director, Smith Agricultural Chemical Co., Columbus, O. Paul T. Truitt, executive vice president of the National Plant Food Institute, represents that agency on the section's executive committee.

In immediate charge of all five regional schools is W. C. Creel, safety director of the North Carolina State Dept. of Labor, and chairman of the section's supervisory training committee. Each individual school has its local director who organizes and guides the school held in his region.

At the Ithaca, N. Y., session S. M. McCargo, personnel supervisor, G. L. F. soil building service served in this post. At the Atlanta school Quentin Lee, purchasing director, Cotton Producers Association, Atlanta, was school principal, and at the Chicago school, this responsibility fell to John E. Smith, safety director, Spencer Chemical Co., Pittsburgh, Kans.

The coming Austin, Tex., school will have A. I. Raney, safety director, Phillips Chemical Co., Bartlesville, Okla., as director, and at San Francisco, John D. Gallagher, senior engineer, NSC, and staff representative for the Council's fertilizer section, will be the director.

Considerable study has been given to the nature of each training school program, and from the early meetings a general pattern has been evolved. Regional directors arrange programs best fitted to local conditions, and participants include fertilizer section officials, outstanding industry authorities on safety problems of particular interest in the different regions, and finally, staff executives from NSC's industrial department.

Typical of all these carefully organized regional programs was that arranged for the Chicago school, held in the conference room of the NSC's Chicago headquarters on Sept. 10 and 11. Some 14 midwestern manufacturing companies sent their key personnel. Paul Truitt came out from Washington, and the Plant Food Institute's Chicago office was also represented.

George L. Pelton, Smith Agricultural Chemical Co., and vice chairman of the fertilizer section, opened the Chicago gathering with an explanation of the school's purpose. Following him, the Chicago school's director, John E. Smith, Spencer Chemical Co., talked on the importance of safety, with stress on the principle that preventing accidents is not a separate activity but an integral part of every job. The supervisor, he emphasized, is the key man in any successful accident prevention program. Continuing, he outlined how a safety program should be presented.

Third representative of the fertilizer section was W. C. Creel of the North Carolina Department of Labor, who spoke twice on the Chicago program. In a talk on "Discovering Accident Hazards," Mr. Creel advanced the idea that "If you discover the hazard, the correction can be found."

A very practical way to discover plant hazards, he suggested, is to know the safety standards that apply. He discussed these standards, dwelling on the practice of regularly scheduling plant inspections as a basic part of a complete safety program. Develop an inspection plan and do it well, he advised. But, he cautioned, "Do not try to place blame. To do so will defeat your purpose. The discovery that somebody is at fault

when an accident occurs is not the place to *stop*, but rather the place to START."

In his second talk Mr. Creel discussed "housekeeping" as a practical method for preventing accidents and also for getting high production, low costs and improvement in employee morale and public relations. The principal reason for the existence and growth of bad housekeeping, Mr. Creel charged, "is the failure of management to recognize that good housekeeping is a definite factor in efficient operation."

The foreman, as the key figure in safety, he asserted, has an opportunity to render valuable service to both management and workers by recognizing the need for good housekeeping, helping management organize a program and carrying this program to the workers.

First of the National Safety Council's staff representatives on the program was David L. Arm, manager of the Council's industrial department. Briefly he discussed the beginning of the safety movement among steel plants and railroads and told how the Council has subsequently become the national clearing house for safety ideas, and the source of technical information, training ideas and materials in all fields.

He examined and interpreted safety's "Three E's," engineering, education and enforcement, then spoke of management's responsibilities, the benefits from accident prevention programs, both humanitarian and economic, and the use of the foreman as a key figure in promoting safety. He also told of the growing interest and attention being given to off-the-job accident prevention as an integral part of industrial safety.

Glenn F. Griffin, director of industrial training for the NSC, was introduced as "the old pro" who had "done more in promotion of accident prevention through training of supervisors than any other living man." Mr. Griffin, in the first of two talks, examined the causes of accidents due to lack of knowledge or skill and to harmful attitudes, physical, mental and emotional, with suggested "prescriptions" for correcting these personal factors. The "cure" to be applied, he said, should be the one which is the most effective, least costly and requires the least follow up.

The safety supervisor's job, Mr. Griffin emphasized, is "prevention, not blame," and the objective of a safety program should be "to make every worker a safety engineer." In his second talk he used an NSC film on "Teaching Safety on the Job," which presented the importance of good job instruction and suggested that the training period should aim at perfection, not production.

R. G. Benson, assistant manager of the Council's industrial department, in a talk on materials and service on safety available from the Council, revealed some stirring facts regarding the tremendous effort put forth by this organization to help the country "watch its step." Among other printed matter turned out, he said, the Council every year prints and distributes 9,000,000 safety posters.

In his run down of materials available from the Council he mentioned technical publications, the authoritative standard accident prevention manual, five minute safety talks for shop foremen, safety instruction cards for employees, training materials such as films and sound slides, posters, banners, special campaign promotional matter, statistical books and pamphlets, instructional courses, incentive awards, the immense library of books on safety maintained at national headquarters and the consultative services with staff specialists. He urged fertilizer section members to get acquainted with this wealth of material and make full use of everything the Council has to help them.

Three technical topics of particular interest to midwestern fertilizer manufacturers were included on the Chicago program. C. Z. Greenly, director of safety for International Minerals and Chemical Corp., who talked on "Materials Handling Problems in the Fertilizer Industry," asserted that a high percentage of injuries in the industry result from handling materials. How to avoid these was the theme of his discussion.

Hazards in production of fertilizer-insecticide mixtures were surveyed by R. C. Fitzgerald, plant manager, Smith-Douglass Inc., Streator, Ill. A major factor in safe handling here, he said, is the extent to which management enforces the precautions listed for personal protection of the worker. "Adequate facilities, protective clothing and equipment," he declared, "are not effective unless the men use them. This requires regular inspections."

The fertilizer industry does not have a very good safety record, it was pointed out by L. L. Lortscher of Spencer Chemical Co. Last year he said, the industry had 8.27 disabling injuries per million manhours of exposure, while the average for all chemical processing industries was only 3.55. He pointed to the explosive industry's low frequency rate of 1.34 to demonstrate that "extreme hazard" can not be used as a valid alibi or excuse by the fertilizer industry.

"In the explosives industry they take safety seriously," said Mr. Lortscher. "Evidently effort and attitude toward safety are more important than the nature of the operation." Asking "Why should the fertilizer industry rate so high in accidents?" he charged that "Primarily it is because of attitude; safety is not taken dead seriously."

"The finest pair of goggles in the world," he added, "is not worth a penny, if a man is in too much of a hurry or considers himself too brave to put them on." Continuing, Mr. Lortscher discussed his assigned topic "Safe Use of Liquid Materials in a Fertilizer Mixture."

One important program feature of the various schools has been

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PROBLEMS of the Agricultural Chemicals Industry as seen by the MANUFACTURER*

by R. B. Marr
Naugatuck Chemicals Ltd.
Elmira, Ontario, Canada

SALES of pest control products in Canada in 1957 were approximately $21,000,000 made up as follows:

Herbicides	$6,500,000.
Insecticides	7,000,000.
Fungicides	5,000,000.
Rodenticides & Live-Stock Treatment	2,500,000.
Total	$21,000,000.

These figures are only approximate, because of combination products and other methods of reporting; however we arrive at an estimated value of $21,000,000 for sales at the wholesale level of final saleable product for the 1957 season for the 12 months ending in Sept. These figures include industrial pesticides, but feeds are excluded.

We must distinguish, however, between the producer of basic chemicals or toxicants and a formulator who starts with these and produces usable formulations. By basic ingredients we mean such chemicals as 2,4-D and 2,4,5-T acid and ester, DDT, malathion, benzene hexachloride and others. Actually, we find that Canadian production of these is limited. Solvents, diluents and emulsifiers are produced in Canada and so are copper sulphate and the arsenates. Any others produced in Canada are largely made by one company,—the balance being imported. In general, the toxicants for organic insecticides are not made in Canada; some fungicides are made here.

There are no published data to show what percentage of the basic pesticide material to produce this $21,000,000 of formulations is made in Canada; however, it is probably safe to say that it is less than 20%. More accurate information is not readily available, because production statistics on products produced by one or two individual firms cannot be released. It can be said, nevertheless, that most of Canada's production of agricultural chemicals is in the making of formulations,—not in the production of the active ingredients used in these formulations.

Trying to estimate the percentage of pesticides which are formulated in Canada is equally difficult. In 1957, sales of pesticides by Canadian registrants totalled 21 million dollars, while in the same year imports were approximately 10 million dollars at the manufacturer's level. We have no means of determining how much of the imports was basic material brought in to be formulated, and how much of the imports were already formulated. Certainly a substantial portion of pesticides sold in Canada are imported as formulations ready to be marketed.

This is a picture of the Agricultural Chemical Industry not generally known. Distribution of agricultural chemicals in Canada is a large and important business, but actually we do not have a very large manufacturing industry.

In discussing problems of the manufacturer we shall omit the daily processing problems common to all chemical production, as they are outside the scope of this discussion. Also, we are not including fertilizers.

Inventories

One of the major problems of the producer is that of inventories of both raw materials and finished

*Report presented at the Canadian Agricultural Chemicals Association, September 16, 1958, Hotel Fort Garry, Manitoba, Canada.

products. There are several reasons why inventories are a serious problem. The shortness of the season when pesticides are in active demand necessitates seasonal production in order not to pile up inventory. This condition also requires ingenuity to use the idle plant for the production of other chemicals during the rest of the year; otherwise, costs are seriously affected. This is particularly true for the basic producer who has a large investment in chemical equipment. If this course of action is chosen, and common equipment is used, great care must be taken to avoid contamination. The potency of 2,4-D is well known, and any contamination by this chemical, even a few parts per million, could be disastrous. The alternative is to produce at a lower rate for most of the year and allow inventories to accumulate. Unfortunately, this increases cost which is undesirable.

Widely Separated Markets

Canadian geography is such that the markets for insecticides and fungicides are concentrated on the East and West coasts; yet, the size of the market permits only one production unit; otherwise, cost of production is excessive. The result of producing in one location is abnormal inventories, and excessive freight rates in supplying these widely separated markets. The large market for herbicides on the prairies is quite distant from other agricultural chemical markets such as in Ontario, Quebec, and the Maritimes. Thus the necessity to supply pesticides in a country as large as Canada, with such long freight hauls on a seasonal basis requires carrying larger than usual inventories for chemical production of both raw materials and finished products. This is based on the assumption that production is confined to one location and is spread over most of the year. The long lead time required for this type of production in purchasing raw materials, some of which may be imported, magnifies the problem.

Too Many Formulations

The large number of formulations of pesticides, and by this I mean different strengths of the same material, also increases the inventory problem. For instance, there are 15 different acid concentrations of 2,4-D amines registered, ranging from .54% up to 96 oz. acid equivalent per gallon. Many of these are not commercially significant, but at least 5 acid concentrations are sold in fair volume. Also, there are 13 different acid concentrations for 2,4-D Ester, ranging from 4.1% to 128 oz. per gallon, and about six of these are commercially important.

While it is true that this problem is one of our own making, nevertheless, these many different formulations do exist, with increased investment tied up in cans, labels, and increased inventory of herbicide.

Forecasting

For the production of basic ingredients used in agricultural chemicals such as herbicides, as soon as shipments are completed for the season on this type of chemical, estimates have to be made of next year's anticipated sales so that raw material orders can be placed and production started.

The importance of correct forecasting of next year's sales can therefore be seen. In 1954 due to a wet summer, much less 2,4-D was used in western Canada, but this was not a "normal" summer. I doubt if there ever will be a "normal" summer so far as weather is concerned; we have been looking for one for the past 15 years and have come to the conclusion that "abnormal" should be considered "normal" for this market.

Cool weather, as a rule, means a lower demand for insecticides; dry weather a poor demand for fungicides, and wet weather prevents herbicide application. The old saying that "It is an ill wind that blows no one good" is true in this instance; but the manufacturer would really like to know in advance, if possible, when and where the ill wind will blow.

In any case, poor forecasting, or shall we say lack of co-operation by the weather, can result in large inventories of both raw materials and finished goods for the manufacturer, or on the other hand can cause shortages. Periodic crop reports, as well as acres seeded, are carefully studied and have been found quite useful in guiding manufacturers when estimating the year's requirements.

Statistics

The C.A.C.A. has done good work since it's organization a few years ago, with advantage to the manufacturer, the distributor, and the consumer. The Technical Section has been active and effective. An annual inventory report on 2,4-D carryover is prepared by C.A.C.A. and circulated, thus supplying producers with valuable information for forecasting future requirements.

Further development of statistics by the Dominion Bureau of Statistics each year on sales and inventories of pesticides is badly needed to set a pattern or trend for the guidance of industry in forecasting.

Excellent co-operation has been extended to the industry by the Canadian authorities charged with the responsibility of protecting the consuming public. They have placed the minimum amount of legislation and restrictive measures in the way of the adoption of new chemicals. In the field of evaluation of promising agricultural chemicals, the various government departments have given excellent support.

Registration

The necessity for renewing registration under the PCP Act each year is considered burdensome and perhaps unnecessary. Unless changes are requested in the labels, it is suggested that a period of 5 years would be more acceptable and I believe the technical section of C.A.C.A. is taking steps to ask for such a revision.

(*Continued on Page* 140)

New Ammoniating Solutions Offer Fertilizer Mixer Easier Granulating Regardless of Weather Conditions

THE development of two new fertilizer solutions linking low salting-out temperatures and low free ammonia content to important raw materials cost savings—equal to several dollars a ton in many instances—has been announced by Spencer Chemical Company. In making the announcement Spencer said its Agricultural Technical Department has been working for some time to achieve this combination of properties which will make solutions both economical and practical to use in all parts of the country, regardless of weather conditions.

Properties of the new solutions, named "Spensol 430" (20-68-6) and "440" (22-66-6), should enable granulators of mixed fertilizer to achieve significant savings, Spencer says. Reasons given are:

1. Less sulfuric acid will be required because of the low free ammonia content of the solutions.
2. Eliminating some of the sulfuric acid in a formula makes it possible to derive more P_2O_5 from normal superphosphate. It also means less plant "smog " creation, a problem in many mixing plant areas.
3. In granulating low nitrogen ratios the low free ammonia of the solutions enables the mixer to use more low cost anhydrous ammonia as a nitrogen source.
4. The solutions contain only 6 per cent water, meaning less freight, less drying and recyle time.

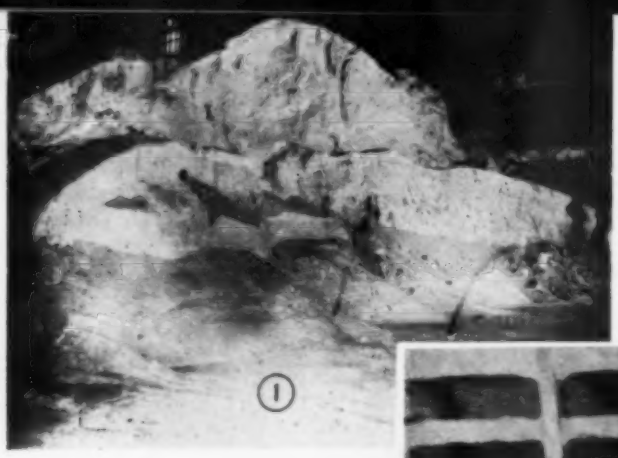
Spensol 430 (43.0 per cent nitrogen) has a fixed nitrogen content of 62 per cent, and a salting-out temperature of 14° above zero. Spensol 440 has a fixed nitrogen content of 59 per cent and a salting-out temperature of 17° *below* zero. According to the announcement, previous solutions with comparable salting-out temperatures contained fixed nitrogen in a range from 48 to 54 per cent. Both new solutions are named in accordance with the new solution nomenclature system recently adopted by the industry through the efforts of the National Plant Food Institute. The basic number denotes the percentage of nitrogen in the solution, and the numbers in parentheses indicate the percentage of ammonia, ammonium nitrate and urea in the total nitrogen content.

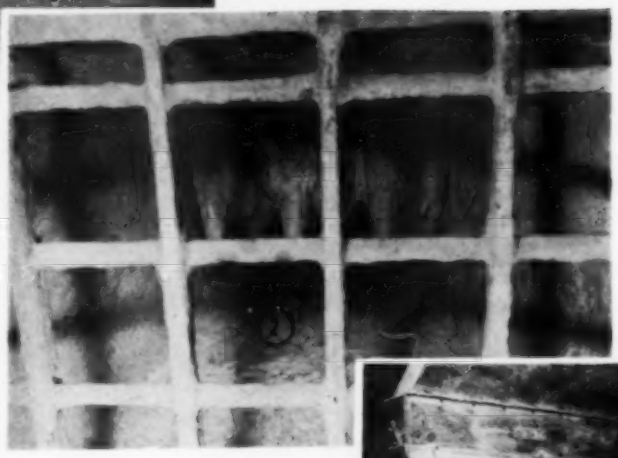
The "dollars and cents" significance of linking a low salting-out temperature with a low free ammonia content was pointed out by Joe Sharp, Spencer's manager of Agricultural Technical Service. "The climate in which a mixer operates can have a sizeable effect on his granulation costs," Mr. Sharp said. "The colder the climate, the lower the salting-out temperature of the ammoniating solution must be. Heretofore, producing a solution with a low salt-out temperature has required raising the free ammonia content, which then requires the mixer to add additional sulphuric acid to tie it up in the formula. However, the unique properties of our two new solutions, combining low free ammonia with low salting-out temperatures, will make it possible for the mixer to figuratively 'have his cake and eat it." Mr. Sharp added that "last winter pointed up the fact to mixers, that, even in the South, it is important to use a solution which has a margin of safety in its salting-out temperature."

Using the granulation of 12-12-12 as an example, Sharp compared the economics of using the new Spensol solutions with current solutions having comparable nitrogen content and salting-out temperatures. "Because of the lower free ammonia content," he said, "you can cut the amount of sulfuric acid needed for neutralization by as much as 133 pounds per ton of 12-12-12. At a delivered cost of $27 per ton of sulphuric acid, the saving is $1.68. In addition, this makes enough room in the formula to allow the mixer to derive as much as 1.3 units more of P_2O_5 from normal superphosphate. At a cost differential of 30 cents per unit between normal and triple superphosphate this means an additional 39 cent savings—or a total of $1.97 per ton in granulating 12-12-12." Mr. Sharp added that the new solutions will contain the "Spensol Greeen" corrosion inhibitor. ★★



Ammoniating solutions containing identical percentages of nitrogen are shown after exposure to cold temperature tests at Spencer's technical laboratoty. The cloudy solution at right has "salted-out" and become unusable, while the clear liquid in the bottle at left shows no change. Spencer is producing two new solutions combining low salting-out temperature with low free ammonia content.





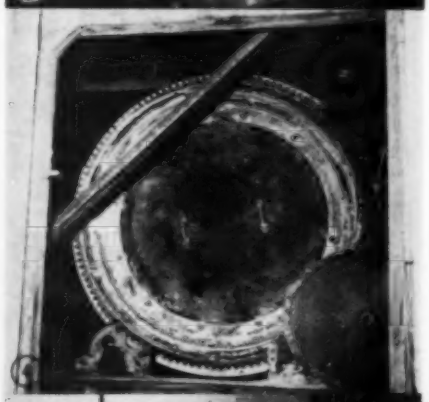
Closed circuit

Operation gives

Top efficiency at:

DAYTON FERTILIZER CORP.







Superphosphate moves from storage (photo 1), is dropped on grate (photo 2), passing through the breaker wheels shown in this photo along with other fertilizer ingredients. The pre-crushed mixture is then conveyed by bucket elevator to vibrating screens. (photo 3 shows the Sturtevant vibrating screen installation at the Dayton plant).

Fertilizer passing through the screens is charged to a one-ton mixer, (photo 4) wherein four-way mixing action intimately combines the ingredients. Oversize materials enter a Sturtevant rotary pulverizer and are recycled.

Newest contribution to the Sturtevant-engineered plant for Dayton Fertilizer Corporation is this hopper (photo 5), which carries the mixed fertilizer to a Kraft automatic weigher-bagger.

APPROXIMATELY 100 tons of fertilizer, used primarily for potatoes, tomatoes, grain and hay, is produced daily at the Dayton Fertilizer Corp., Dayton, New Jersey, just outside New Brunswick. The major portion of the plant food is of standard formulations, but special requirements are met regularly, and extensive experiments using several plant food elements, studying their effect on plants, are conducted in conjunction with other research programs in this highly agricultural region.

Dayton employs a closed circuit method of formulating fertilizers, engineered and fabricated for the five-year-old firm at its inception by Sturtevant Mill Company of Boston, Massachusetts. Because of this closed-circuit operation (from introduction of fertilizer ingredients to the bagging of the finished plant food) special formulations do not present special problems. Dayton vice president, William Nist, hails this method as "best for special formulations," and he considers it one of Sturtevant's main services to the fertilizer field.

As an example, if a local farmer should wish minor elements or a special insecticide incorporated in his fertilizer, these materials would be introduced at the hopper with other ingredients,—they would be carried by elevator to and through vibrating screens, to the mixer or pulverizer, to the bagger (or directly to the bagging unit if desired, via a second bucket elevator). When the special formula is completed, Dayton may switch back to routine operations without delay, without having tied up any particular equipment.

Normally, the various ingredients are dumped, a ton at a time, into a receiving hopper, passed through chain-driven breaker feeder to a bucket elevator. From this point, they are conveyed to five horsepower vibrating screens. Fertilizer which passes through is charged into a one-ton mixer, wherein four-way mixing actions — vertical, circular and two lateral—intimately blend the ingredients. Oversize particles are diverted to a rotary pulverizer, which reduces them down in size and re-directs them to the bucket elevator for conveyance, once again, through the screens, and thence to the mixer.

After the blending operation, during which ammonia is added and the ingredients are cascaded in a 180° arc by revolving buckets and forced from one end of the blending drum to another, giving the four mixing actions, the product is discharged into a second bucket elevator which conveys the material to a curing pile.

Once cured, the fertilizer is again dumped into the receiving hopper, through the breaker feeder, then conveyed by the bucket elevator to the screens and pulverizer to reduce the oversize particles caused by normal caking. This time the fertilizer bypasses the mixer, going directly to the second bucket elevator which carries the fertilizer to the bagging hopper. (Bagging operations only recently were re-adapted to allow exact weight discharge from a hopper engineered and installed by Sturtevant during the summer of 1957.) The cured fertilizer that does not pass through the screens is diverted to the rotary pulverizer and recycled.

All processes and equipment (except for the latest innovations of batch weighing which incorporate a Sturtevant hopper and a Kraft weigher)—were engineered, fabricated and installed by Sturtevant Mill Company in 1952. Since that time, the equipment has needed only minor, intermittent maintenance and parts-replacement.

According to L. H. Edwards, plant manager: "It's better when you don't have to clean or bother too much with the equipment. In the corrosive environment of a fertilizer plant, once you begin removing corrosive deposits from the equipment, you expose the fresh metal to more corrosive activity and, in turn, lessen its overall life. However, the equipment in our plant is real sturdy and is going to last for a long time, despite the environmental challenge it faces."

Performance indicates that Mr. Edwards is correct. In the half-decade of operations, chain and buckets on the #2 elevator have needed intermittent replacement—but this is the elevator which conveys the high-temperature, highly-corrosive ammoniated fertilizer from the blender to the cooling and curing pile. In contrast, no parts replacement has been necessary on elevator #1, which conveys the raw material into process—minus the ammonia—and later conveys the cooled, cured, less corrosive fertilizer to the screens and pulverizer for breaking up the oversize into powdered fertilizer that is to be bagged.

Screen cloths are replaced about once a year—a minimal maintenance cost for units which size 180,000 pounds of corrosive materials daily. Mixer seals and buckets need intermittent replacement,—but this, too, is understandable, since ammonia is introduced directly into the mixer during the blending of the raw materials. This highly corrosive atmosphere would, naturally, bring about the need of parts replacement. It is surprising, Dayton officials say, that the inner drum of the mixer, as well as the seals and buckets, have not needed replacement.

Overall, maintenance requirements have been very minimal, and the Dayton plant has been operating at top efficiency since it was put on-stream in 1952. It has, since that time, produced about a hundred tons a day of uniform texture, high-quality, special fertilizer for Dayton's customers.★★

A closed circuit operation—from introduction of materials to bagging—offers maximum efficiency in fertilizer production; with minimum delay in switching from standard to special formulations.

COSTS and PROBLEMS in

THE numerous perplexing problems that must be solved, and the tremendous investment that must be made in time and capital, before a successful new pesticide can be introduced to the agricultural market were detailed in an address by Dr. R. H. Wellman, manager of the Agricultural Chemicals Division of Union Carbide Chemicals Co., before the American Institute of Biological Sciences at Indiana University, Bloomington, Ind., August 26. In his talk, "Commercial Development of Fungicides", Dr. Wellman broke down the various cost factors and brought up to date some cost formulas which he first presented in an article in the September, 1952, issue of *Agricultural Chemicals* under the title "Economics of Developing Agricultural Chemicals."

During the past 15 years, he emphasized, attitudes toward research, development and marketing of agricultural chemicals have undergone drastic change, – the most significant change being the emphasis which must now be placed on teamwork. To launch a modern day fungicide, or as a matter of fact any type of agricultural pesticide, he observed, "research teams, development teams, and marketing teams all must be involved – with each team working out particular phases of mutual problems." And the cost of such a major effort in introducing a single successful commercial product can readily run to upwards of a million and a quarter dollars.

A particularly serious problem, which did not exist to nearly such a degree fifteen or twenty years ago, is that today it is extremely difficult to find a compound that will outperform the many effective products already on the market. Companies seeking to develop new pesticides which will merit the high costs of introduction must screen many more compounds than they did twenty years ago to discover a single one which will merit further intensive testing. "Today, a company must have a really outstanding compound in order to interest agricultural experiment station people."

Dr. Wellman indicated that approximately 10,000 compounds a year are synthesized in commercial laboratories and allowing for duplication perhaps about 5,000 of these are different from each other. Only about one compound a year survives the long test period and eventually emerges as a commercial product. In the accompanying table he estimates the cost of the single successful commercial product at approximately a million and a quarter dollars. To this initial basic figure, of course, must be added the further costs of toxicological work, investment in a plant to produce the product and, in due course, the various market studies, patent costs, publicity, advertising and educational work.

In addition to the heavy costs involved in developing the compound, proving its effectiveness and gearing up for commerical production, Dr. Wellman added, industry also has important responsibilities under the Federal Insecticide, Fungicide and Rodenticide Act and the Miller Amendment to the Federal Food, Drug and Cosmetic Act. First, the efficiency of the product must be proved. Second, it must be determined what residues will result from use of the product in the recommended fashion. (This necessarily involves the development of highly sensitive and precise analytical methods). Cost - approximately $50,000. A third responsibility is to determine the toxicity of the new material to man and animals. (This normally involves two-year feeding tests on short-lived animals and a one-year test on another species, - all at various ious dosages). Cost of this work may add an additional $50,000 to the development bill.

Following perfection of analytical procedures and having received a toxicological okay, the next step is application for registration. The tolerance granted, Dr. Wellman reminded, "will be no greater than the minimum amount shown neccessary to give adequate protection to the crop no matter how low the toxicity of the fungicide". Thus the approach must be "to see how much residue remains after following a recommended schedule and determine if this is safe, rather than to decide how much is safe and establish a tolerance on basis of safety only. A rule of thumb, sometimes mentioned, is that the residues remaining must be less than 1/100th of the maximum amount which in the total diet results in no effect on the laboratory animals. Sometimes a lower factor of safety is warranted, sometimes a higher one is necessary."

Government research agencies, both state and federal, absorb another important share of the cost

DEVELOPING NEW PESTICIDES

of developing any new agricultural pesticide, taking over after promising new compounds have been synthesized and screened in industrial laboratories. Federal and state workers have the responsibility for determining how the new materials will best fit into the complicated spray schedules. They determine exact dosages and proper timing of sprays and study compatibility with other materials. Dr. Wellman estimated that, on a typical promising new material, an average of three government scientists may be working on the product in each of thirty states, spending perhaps one-fifth of their time on this particular product. Their annual bill for equipment, expenses, overhead, administration, etc., on this single product, he estimated, would be in the neighborhood of $300,000 - or twice that for the normal two years of test results required. And after their work is finished, there is still the added cost of the work of extension personnel and county agents in bringing the new materials to the attention of the potential users on the farm.

Before the successful new product can be introduced commercially on a broad scale there are still other factors to be considered. Dr. Wellman listed them as follows: (1) market study; (2) timing; (3) physical and chemical properties; (4) formulation; (5) biological activity; (6) product specifications; (7) toxicological data and residues; (8) labeling; (9) patent considerations; and (10) merchandising.

A "market study" must be conducted to determine the extent of the potential market, and the rapidity with which sales may be expected to grow, the necessary selling price, cost of manufacture, etc., for unless all of these add up to a profitable operation, it is obviously poor business to hazard the required heavy further investment in plant, merchandising and promotion. "Many of the failures of individual products and even some of the failures of entire programs in the agricultural chemicals field", Dr. Wellman asserted, "could have been avoided had an adequate market survey been conducted early".

Industry's Costs of Researching A New Fungicide (Excluding Toxicological Costs)

Synthesis	$160
Initial Screening	200
	$360
divide by 3 because they are also tested as herbicides and insecticides	$120
1 in 45 succeed	x 45
	$5,400
Further laboratory and greenhouse work	1,000
	$6,400
1 in 20 succeed	x 20
	$128,000
Initial field tests	1,000
	$129,000
1 in 3 succeed	x 3
	$387,000
Company development cost	250,000
	$637,000
1 in 2 succeed	x 2
	$1,274,000

On the point of correct "timing" Dr. Wellman observed that a new agricultural chemical should best be introduced to the farmer "as soon as possible", that is "as soon as its effectiveness and its safety are established and the formal requirements of the Miller Bill and the Federal Insecticide Act have been satisfied", but at least "not until experiment station personnel have had the opportunity to evaluate the material under their own conditions." He reminded that "it is unfair to ask experiment station people to spend their time evaluating a new material unless there is reasonable assurance that it will be made available to growers if successful".

"Physical and chemical properties" must be studied exhaustively, "in particular every property that affects the safety of workers or handlers, such as vapor pressure, flash point, and explosive limits. . . Light stability, water solubility and rate of hydrolysis under acid and basic conditions are particularly important." And, he reminded "for agricultural chemicals, a proper formulation often determines the success or failure of a candidate material. . . . The formulation must be easy to use, concentrated enough to be economical, and designed to

(*Continued on Page* 137)

AMMONIA



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Rohm & Haas Wins Latest Round in "Dithane" Patent Case

ROBERTS Chemicals, Inc., Nitro, West Virginia, has just been found guilty of having violated an injunction which required the company to cease infringing the patent of Rohm & Haas Co., Philadelphia covering "Dithane," (the Rohm & Haas trade name for nabam and zineb fungicides.) In a recent ruling (August 25, 1958) by District Judge Ben Moore in the U. S. District Court for the Southern District of West Virginia, decision was rendered that an injunction previously issued had been violated, that the defendant company and its president, Elmer A. Fike, were in contempt of court, and that Rohm & Haas Co., the plaintiff in the case, is entitled to damages for acts in violation of the injunction. No punitive action was taken against the defendants, although it was noted that such action would be considered appropriate if further violations of the injunction (originally issued October 11, 1957) should take place.

Roberts Chemicals' product is "Amobam," a 42% solution of diammonium ethylene bisdithiocarbamate, which is recommended for insect as well as disease control on a series of crops including corn, celery, potatoes, tomatoes, citrus, peaches, cherries, apples, etc.

Roberts Chemicals, Inc., was started in January, 1953, by two former employees of Monsanto Chemical Co., its purpose being to manufacture agricultural chemicals that might not appear to offer sufficient sales volume to interest larger companies. The first Roberts product was a herbicide (ethyl xanthic disulfide) tradenamed "Herbisan." It had been developed at Monsanto, but Monsanto decided not to exploit it. Later that first year of its operations Roberts started making DDT, and in 1954 they started to produce dithiocarbamate fungicides, as well as 2,4-D and 2,4,5-T. The latter products eventually disappeared from the line, but fungicides were manufactured in increasing volume. In 1956 one of the founders of the company sold his stock interest to Caribou Chemical Co., Columbus Ohio. Caribou has undertaken the role of conducting research on new products, while Roberts produces the chemicals developed by Caribou.

Early in its operations in the fungicide field Roberts came into conflict with Rohm & Haas. In the summer of 1953 Roberts requested a license from Rohm & Haas to operate under the R & H patent, but the request was refused.

Noting that E. I. du Pont de Nemours & Co. had been manufacturing nabam for several years without any reaction from Rohm & Haas (they have since been licensed), Roberts began production of nabam in December, 1953. Rohm & Haas replied by entering suit, charging infringement of their patent.

The trial was heard in January 1956 in the District Court in Charleston, W. Virginia and the trial court found the R & H patent to be invalid. This decision was reversed on appeal however, by the Fourth Circuit Court of Appeals and on October 11, 1957, an injunction was handed down ordering the Roberts firm to cease the sale of fungicidal products in violation of the Rohm & Haas patent. They secured a temporary restraining order which prohibited Rohm & Haas from stating to Roberts customers that use of the product as an insecticide or a miticide was an infringing use. The new and non-infringing uses which Roberts claims to have developed for "Amobam" include the following:

(1) applying the product to the soil
(2) control of insects rather than fungi, and
(3) reaction of their product with calcium hypochlorite to form a more effective fungicide not covered by the Rohm & Haas Patent.

In the trial, Roberts had attacked the Rohm & Haas patent, charging that Rohm & Haas misused the patent by attempting to extend their monopoly to cover non-patented uses. They emphasized that the R&H patent is a "use" patent, rather than a "product" patent. It gives Rohm & Haas the right to exclude others from practicing the invention covered by the patent, they agreed, but not the right to exclude others from manufacturing or selling the product. The Court of Appeals, however, decided there was no misuse, and indicated that the point was not at issue in the contempt hearing.

The Roberts claim was that since they have developed uses for the product which do not infringe the R & H patent that Rohm & Haas should have no right to restrain them from making the product and selling it for these non-infringing uses. They point out that since the trial first got under way they have received a patent on "Amobam" as a compound (issued July 22, 1958) and several other patents have also been issued covering what they characterize as "non-infringing" uses, including a pending application on the tank mix method.

To support their argument that companies holding merely "use patents" have no right to control manufacture and sale of a product as well, Roberts attorneys cited the cases of Geigy with DDT and American Chemical Paint Co. with 2, 4-D, who licensed their patents widely in each case. Thus on June 3, 1958, attorneys for Roberts filed two motions, one ask-

(Continued on Page 138)

J. H. Elliott Elected President of Canadian Agricultural Chemicals Association

A DISCUSSION of "problems of the agricultural chemicals industry," as seen by the manufacturer, distributor, extension worker and farmer, highlighted the annual meeting of the Canadian Agricultural Chemicals Association, held September 15-17 at the Fort Garry Hotel, Winnipeg, Manitoba. Speaking on the position of the manufacturer, R. B. Marr, general manager of Naugatuck Chemicals, Ltd., observed that "while 21 million dollars worth of agricultural chemicals are distributed annually in Canada, only part of this is produced in that country. The Canadian manufacturer," he said, "shares the market on these tariff-free products with large companies in other countries. The resulting low volume of production, together with serious inventory problems caused by the widely separated markets, and the seasonal demand for pesticides, restricts the production of agricultural chemicals in Canada, and also limits the amount of research which is done there." (The complete text of Mr. Marr's remarks and comments on high freight costs, competition with non-Canadian producers, etc., appears on pages 37-38 of this issue).

The greatest problem and unknown quantity confronting the distributor, explained Arwid Lindenberg, Lindenberg Bros., Canada, is the question of "what is to be expected of the coming season?" . . . for example, what kind of pests and weeds are likely to require control; how much and what kind of chemicals should be stocked; etc. He observed that weather conditions play a major role in extent of weed growth, insect growth and development,—and that the distributor relies heavily on various government agencies that survey and forecast possible outbreaks of the various insects, diseases, etc.

Still another problem,—and one which is obviously one of the distributor's own making, he said, "is the constant jockeying for position, — a certain amount of high pressuring of dealers,—the dumping of large quantities of chemicals in certain areas on speculation . . . which tends to upset the market and undermine the confidence of those handling and using chemicals."

The eternal price question in the agricultural chemicals industry was also mentioned by Mr. Lindenberg, who observed that "every year we go through a series of price adjustments. Some firms," he said, "seem to wait until a schedule is established, so that they can under-sell by 15 to 25¢ per gallon. Another condition contributing to the price problem is speculation and panic selling. The very nature of the farm chemical business involves some speculation,—but too often, it is done by a firm that can ill afford to do it, and the goods must be sold at any price to remain solvent even temporarily." No solution, of course, seems practical.

J. C. Gilson, University of Manitoba, guest speaker at the Canadian meeting, considered various phases of the "Farm Problem," but he too referred to the problem of the price-cost squeeze in agriculture. "Farm prices (in Canada) are declining as a result of an exuberant production, an inelastic demand for food, and a sluggish international market.

"There is a great need for imaginative policies and vigorous programs of action for the farm industry of the future. Policies and programs are needed to help farm families to adjust to technological changes. Policies will need to consider farm credit, farm management services and programs for the technologically displaced farm families."

Mr. Gilson continued to say that, "it would appear that price and marketing policies are here to stay in Canada. These policies are important to the commercial segment of the agricultural industry, but they must be used with caution and discretion. A poor, or badly constructed price and marketing policy could lead to still other undesirable consequences. A sound, well-conceived policy, could prove to be a blessing to Western farmers."

As part of a symposium on new developments in agricultural chemicals, W. B. Fox, Chipman Chemicals, Ltd., reviewed some of the new insecticides, offering the following comments on these chemicals and the classification shown in table 1.

Demeton, *Phosdrin*, and *Thimet* are systemic insecticides, transported in the sap stream when applied as sprays to the foliage or roots of plants and are effective principally against sucking insects. Thimet is used principally as a seed treatment on cotton and legumes.

Co-ral and *Trolene* are used for the control of warble grubs in cattle. The former is applied as a spray and the latter administered as a bolus into the animal's stomach. These insecticides travel in animal tissues, killing developing warble fly larvae.



J. H. Elliott

Diazinon, Ethion, Guthion, and *Trithion* are non-systemic insecticides of relatively low toxicity to mammals. They have a wide range of activity against both sucking and chewing insects.

Chlorthion, Dicapthon and *Dipterex* are of low mammalian toxicity, effective for the control of flies and other insects.

Malathion with a long history of effective fly, aphid, and scale control of livestock and poultry lice and mites. A single treatment provides an effective control for a considerable period of time.

Of the non-phosphorous types of insecticides, *Endrin* has a high activity against a wide variety of insects, coupled with a high mammalian toxicity by all routes of entry.

Aldrin, Dieldrin, Heptachlor and *Toxaphene* have somewhat similar activities. Dieldrin and Toxaphene have a longer residual life than Aldrin and Heptachlor. Aldrin is converted to its epoxide, Dieldrin, on plants, in the soil and in animals. Similarly, Heptachlor is converted to its epoxide. The epoxides appear to have a higher activity than the parent compound. In addition to Lindane, Aldrin and Heptachlor are used for seed treatment for protection against soil insects. In this respect, Lindane has systemic action in *Brassicae* against flea beetles.

Sevin and *Thiodan* are new chemicals which, coupled with relatively low mammalian toxicity, have wide activity against a variety of insects.

Mr. Fox concluded with the observation that, "regardless of the damping effect of residue tolerance regulations upon the development of new insecticides and new uses of insecticides, great progress is being made in insect control and we appear upon the threshold of many new concepts of insecticidal development."

New chemicals by the thousands are produced by the large chemical companies each year and screened for possible value as fungicides and seed dressings, reported W. E. Sackston, Canada Department of Agriculture. Pathologists of the Canada Dept. of Agriculture laboratory at Winnipeg, obtained excellent wheat rust control in 1956 in field plots with complex organic salts of nickel submitted by Rohm & Haas. The Winnipeg pathologists proved in 1957 that simple inorganic salts of nickel, applied after the wheat was infected, could stop rust development and increase yields from field plots by eight bushels per acre. The results of 1958 plot experi-

(*Continued on Page* 123)

J. H. Elliott of Rohm & Haas Co. of Canada Ltd., West Hill, Ontario, was elected president of the Canadian Agricultural Chemicals Association at its sixth annual conference in Winnipeg.

Elected to serve on the 1958-59 Board of Directors were: first vice-president, Bruce Marr, Naugatuck Chemicals Division, Dominion Rubber Co. Ltd., Elmira, Ont.; second vice-president, J. K. Brown, Green Cross Division, The Sherwin-Williams Co. of Canada Ltd., Montreal; secretary, J. S. Wilson, Dow Chemical of Canada Ltd., Sarnia, Ont.; treasurer, D. K. Jackson, Monsanto Canada Ltd., Montreal, Que.

Table 1

A Classification of Some Newer Registered Insecticides

Toxicity to Mammals	Phosphate Ester		Chlorinated Hydrocarbons And Others	Rat Oral LD 50 Mg/Kg.	Residue Tolerance P.P.M. Vegetables (Lettuce)
	Systemic	Non-Systemic			
Very	Demeton			6-12	(0.75)
High	Phosdrin			2.9-46	0.25
	Thimet			1.75	N.R.
		(Parathion)		6-15	1
			Endrin	5-45	0.25
			(Nicotine)	10	2.0
High		Guthion		15-25	(2.0)
		Trithion		28	(0.8)
			Aldrin	50	0.25
			Dieldrin	60	0.25
			Heptachlor	90	0.1
			Toxaphene	40	(5)
	Co-ral			90-150	
	Trolene			1740	
		Chlorthion		1500	(1)
		Diazinon		220-270	0.75
		Dicapthon		475	—
		Dipterex		450	—
		Ethion		179	—
		Malathion		480-2103	8
			DDD	2500	7
			(DDT)	250	7
			(Lindane)	125	10
			Methoxychlor	5000-7000	(14)
			Sevin	500-700	(10)
			Thiodan	110	N.R.

Soil-Testing

AN AID IN PLANNING FERTILIZER PROGRAMS

by George H. Serwitt
GLF Soil Building Service
Ithaca, New York

IT took many years for soil testing, as we know it today, to become recognized as a valuable aid to farmers in planning their fertilizer programs. Various methods of determining the acidity or lime requirement of a soil were in regular use for years before even the introduction of tests for phosphorous, potassium, etc. Even today there are skeptics among agronomists but the rank and file of agronomists who have had experience with the tests, and who are responsible for making recommendations to farmers, feel they are of great value. No one claims that soil tests are perfect, or that other things such as past treatment, type of soil etc., should not be taken into account in making recommendations, but they certainly take a lot of the guess work out.

It is true that a trained agronomist who knows the soils of a given area can walk over a farm, sit down for a while with the farmer, find out what his past program has been and come up with a pretty good set of suggestions as to a fertilizer program. There is one very important catch to this procedure, which of necessity was what was followed for many years. The catch is that there is a limit to the number of farmers that can be visited in a day. After something over ten years experience as an extension agronomist, I would say that six farm visits a day is a pretty good average, if you spend any time with a farmer in going over his fields and discussing his fertilizer problems. Since most county agricultural agents have many programs in addition to fertilizer, they cannot help many individuals in this manner. There are far fewer extension agronomists than county agricultural agents, and they too usually have other programs that are important. Even if the extension agronomists did not have other programs, they could not effectively reach many farms in a state on a farm call basis.

By means of a soil testing program, the effectiveness of an extension agronomist or county agricultural agent can be multiplied many times. What is more, the actual figures as to the plant food content of the soil on a given field make more of an impression on the average farmer than even an educated guess by a man he considers an expert.

There are many different types of soil testing laboratories. Probably the most generally used is the central laboratory for an entire state operated by the State College of Agriculture, or in some states by the Department of Agriculture. Some states have county laboratories. Many companies processing vegetable crops have their own soil testing laboratories and employ trained men to advise their contract growers. Some fertilizer companies operate their own laboratories. There are also private laboratories where a farmer for a fee can have his soil tested and also secure advice. Many companies distributing fertilizer will pay for having a patron's soil tested at the state laboratory, rather than operate their own. We will not attempt to argue the merits of the various methods of testing, but do suggest that a farmer having his soil tested submit it to a laboratory that is using a method that is backed by research.

Does soil testing increase fertilizer tonnage? That is a question that is hard to answer. There was quite an increase in fertilizer tonnage during the period when soil testing was increasing rapidly. Practically all fertilizer companies benefited from this increase, whether they operated or sponsored a soil testing laboratory or not. There are more and more farmers though, who insist on a soil test before they will place an order. They do not, on the other hand, always place it with the company that made or paid for the test.

We feel though that farmers using a good soil testing service have benefited greatly. In our experience they have often shifted to grades that better fitted their needs, even if they did not use more fertilizer. Some have used more, but a few who had been heavy users of fertilizers in past years have used less. Most of the recommendations that we have seen call for more fertilizer than the farmer has been in the habit of using. As he develops confidence in the soil test, we feel that he will follow recommendations more closely. We feel that the day is not far distant when a good farmer will not spend money for fertilizer unless he has first had his soil tested.

There is one bottleneck to soil testing that will have to be removed and that will require the farmers cooperation. Laboratories

(*Continued on Page* 137)

what's your E.Q.?*

QUESTIONS

	True	False
1. Inorganic salts are frequently added to oil-water systems to break emulsions.	☐	☐
2. It is impossible to prepare practical emulsions in which the aqueous phase contains high concentrations of inorganic salts.	☐	☐
3. Good agricultural emulsifiers may be characterized as individual specific chemical compounds.	☐	☐
4. The anionic components of an agricultural emulsifier impart improved performance in soft water.	☐	☐
5. A good emulsifier can be fully characterized by the ratio of anionic to nonionic components.	☐	☐
6. The active ingredient content of an emulsifier is the chief criterion of its efficiency.	☐	☐
7. Variations in toxicant, solvent and waters require adjustments in emulsifier blend for optimum performance.	☐	☐
8. The ratio of the emulsifiers in a matched pair need not be altered when the concentrate is used at high or low dilution rates.	☐	☐
9. In general, it is safer to formulate slightly higher on the nonionic side than on the anionic side when employing matched pairs.	☐	☐
10. Most formulators use the correct amount of emulsifier in their emulsifiable concentrates.	☐	☐

*Emulsifier Quality

ANSWERS

1. True. Most emulsifiers "salt out" in the presence of inorganic salts which impairs their function and breaks the emulsion.
2. False. Emcols H-A, H-B and H-C are used to emulsify insecticides in concentrated mixed fertilizer solutions in which the salt concentration may approach saturation. These emulsifiers have a unique tolerance to high salt concentrations.
3. False. Most efficient agricultural emulsifiers are blends of several anionic and nonionic surfactants.
4. True, if properly balanced with nonionic components. Conversely, the nonionic components of such an emulsifier impart improved performance in hard water.
5. False. It is not sufficient to balance the anionic-nonionic ratio. Since both anionic and nonionic components have hydrophilic and lipophilic properties, each in turn must be properly balanced to obtain maximum efficiency at the minimum use level. This requires blending several components, in some cases as many as 12 different surfactants.
6. False. The composition of the separate components and their balance is the prime consideration.
7. True. This is achieved most conveniently by the use of matched pairs of emulsifiers.
8. False. The rate of dilution required by the particular field application affects the blend of the matched pair necessary for optimum performance.
9. True. An excess of nonionic may result in excessive creaming which can easily be redispersed, but an excess of anionic may result in a tendency toward oil separation.
10. Only you can answer this. If you are using Emcols, you are saving money because they can be used at low use levels and give outstanding aging stability. Low moisture content, the rigidly controlled components, and Emcol know-how allow you to manufacture superior concentrates at competitive prices.

SCORING: If most of your answers were correct, you definitely have emulsifier "know-how". And most formulators with "know-how" look to Emulsol for leadership in the field of emulsifiers for the pesticide industry. This leadership is based on continued **research** into new problems which arise such as liquid-pesticide, liquid fertilizer formulations . . . on rigid **control of production** by an outstanding staff of chemists . . . on **technical service** to help you with your particular problems.

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No secret. Just used Oldbury sodium chlorate. It's been around for a long time.

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Nope. Don't need anything fancy. Just a tank to hold the sodium chlorate solution and something to spray it on with.

Will this Oldbury sodium chlorate kill Russian Knapweed?
You name it, sodium chlorate will kill it. This stuff completely sterilizes the ground, so you can get rid of all weeds with just one application.

How can I set up a program for my county?
Get hold of a Hooker salesman. He'll put you in touch with one of their agronomists. He can tell you anything else you want to know. They've got a plant right near you, too, in Columbus, Mississippi. I get mine from their plant in Niagara Falls.

Can I keep this bulletin you showed me?
I'd like to hold onto that myself. Why don't you just write Hooker and ask them for one?"

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J. Dreessen

NAC's staff shown above

NAC's 25th meeting at the General Oglethorpe in Savannah, Ga. Oct. 29-31



Lea Hitchner
Executive Secretary

Wednesday, October 29

9:30 Meeting called to order

9:45 Presidential Address
J. V. Vernon, Food Machinery & Chemical Corp.

10:15 "Confusion Out of Chaos—Progress Report"
John L. Gillis, Monsanto Chemical Co.

10:45 Address—Hon. Herman E. Talmadge, Georgia Senator

11:15 Public Relations Panel
Moderator: Charles S. Maddock, Hercules Powder Co.
Cynthia Westcott, Glen Ridge, N. J.
Stephen G. Pugh, Southern Bell Telephone & Telegraph
NAC staff member

12:00 Luncheon—Fashion Show

6:30 P.M. Reception for members and guests

7:30 Board of Directors dinner meeting

Thursday, October 30

10:30 Joint meeting (Report on Operations of Miller Bill)
NAC Technical Advisory Committee
NAC Regulatory Advisory Committee

6:30 PM Barbeque

Friday, October 31

9:30 AM Introduction of newly elected Board of Directors

9:45 Address—Frank S. Washburn, American Cyanamid Co.

10:15 NAC Staff Report

10:45 "Product Liability Claims & Suits"
John D. Conner, NAC Counsel

11:00 Panel Discussion on New and Expanding Markets
Roadsides—Wilbur J. Garmhausen, Ohio Dept. of Highways
Soil Fumigation—Herbert L. Haller, USDA
Forests—William Johnson, Union Bag & Paper Co.
Export Horizons—M. W. Melander, Stauffer Chemical Co.

6:30 P.M. Reception for members and guests

THE National Agricultural Chemicals Association observes its 25th anniversary this year when members convene at the General Oglethorpe Hotel in Savannah, Georgia, October 29-31. J. V. Vernon, of Food Machinery & Chemical Corp., is president of NACA.

The program for the ladies includes a luncheon-fashion show on Wednesday. Other social events include: A reception for members and guests on Wednesday evening and the Silver Anniversary dinner on Thursday, October 30th.

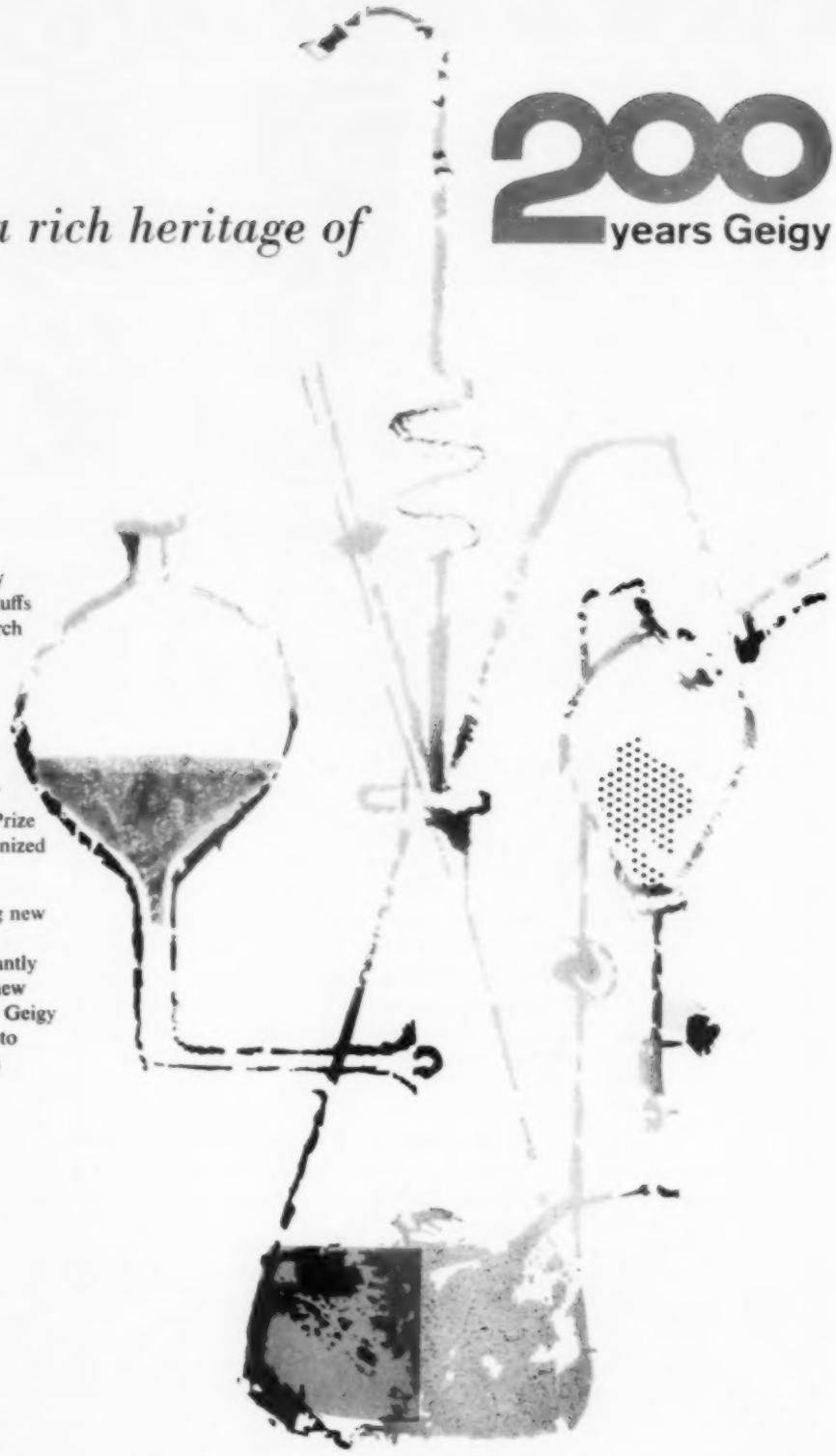
NAC advises that bus transportation with hourly departures will service the DeSoto Hotel in downtown Savannah. A hospitality room will operate in the DeSoto.

Chairman of the Arrangements Committee is Alfred Weed, Olin-Mathieson Chemical Corp. Other members of the committee are: W. P. Crown, Carolina Chemicals; K. K. Krausche, Floridin Co.; and M. E. Williams, Dawson Cotton Oil Co.

The Silver Anniversary Golf tournament will be held on Thursday, October 30th. Leon Kaniecki of Tennessee Corp., is chairman of the golf committee.

out of a rich heritage of

200 years Geigy

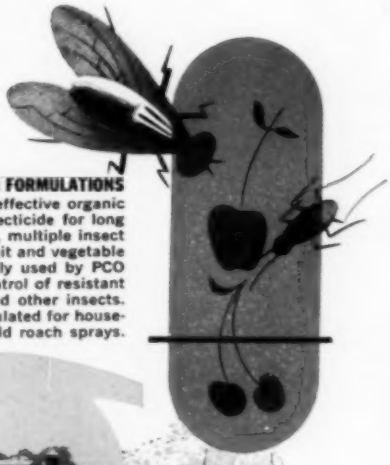


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Geigy scientists will go on blazing new trails. Research and development programs, and facilities are constantly being expanded—new ideas and new concepts continually tested. From Geigy Research, the future will continue to bring still more effective pesticides —for the benefit of all.

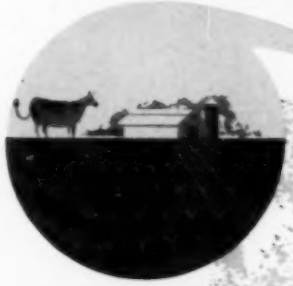
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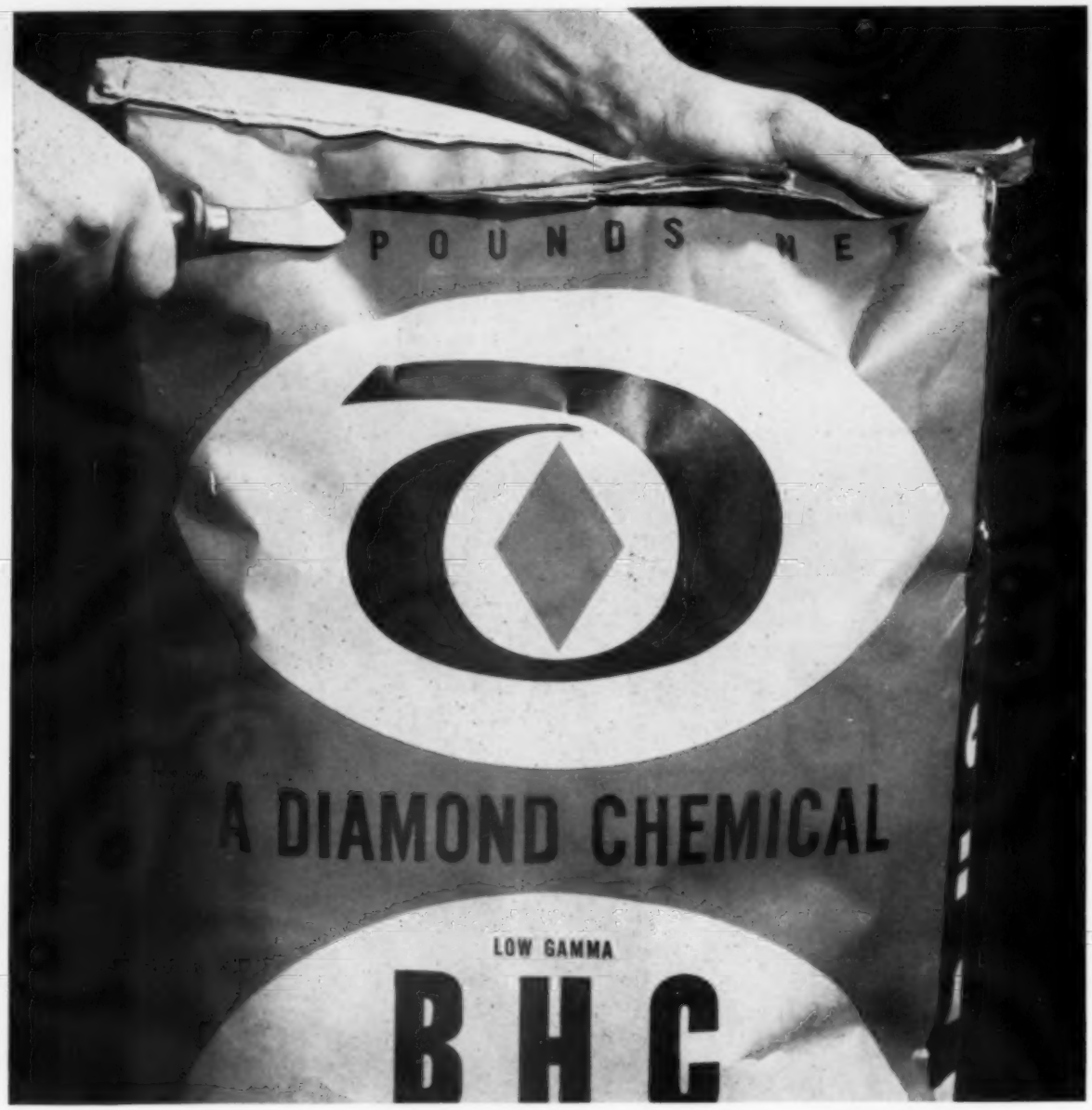


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- High-Clearance Rigs
- British Crop Plane

  De Haviland Modifies R.A.F. Trainer For Agricultural Use
- Herbicide Application



High-Clearance Rigs For Applying Liquids

by E. Buford Williamson
Agricultural Engineer
Delta Branch Experiment Station
Stoneville, Miss.

THE high-clearance self-propelled applicator machine is a relatively new type machine that has been used rather extensively the last 2 or 3 years in some areas in the production of cotton. These machines first appeared in the Cotton Belt about 10 years ago, but they did not gain prominence until 1955, a year in which late-season rains caused rank growths of cotton and severe insect problems. By the end of 1957 over 2000 of these machines had been operated by farmers in the lower Mississippi Valley and several hundred more were reported in use in California, Texas, other irrigated and bottomland areas, and coastal plains of the Southeast. Most of the rigs were equipped with 8-row sprayers and were used primarily for the application of liquid insecticides.



Special self-propelled, high-clearance sprayers and dusters, such as this one, have been developed for treating crops of any height with insecticide sprays. The spray bar is adjustable and can be raised or lowered as desired. These rigs can cover eight rows per run.



An early version of the high-clearance sprayer is this unit in which the spray bar is attached to a tractor to spray onions. (Used in Calif. in 1945.) Obvious disadvantages include the need for an extra man to control the spray bar, and limited coverage. (USDA Photos).

Several factors influenced the development of this new agricultural tool and its eager acceptance by cotton farmers. Foremost was the development of synthetic organic insecticides shortly after World War II, which made possible the spraying method of applying insecticides. Previously, most insecticides had been applied as dust, and insect control often suffered because dusting was usually an off-hour, disagreeable task to the farmer.

The introduction of the synthetic organic compounds was accompanied by the development of the low-gallonage, low-pressure sprayer. Some research workers first used this inexpensive applicator in conjunction with the cultivator, so that early spraying for thrips and other cotton insects could be accomplished simultaneously with regular cultivation. As a result, many farmers became interested in a chemical-control insect program for the first time, and several thousand of these machines were sold in the Mississippi Valley alone in 1950 and 1951. However, the practice of combining these two important operations did not prove entirely satisfactory. It soon became evident that the interval of spraying for insect control was often different from that required for cultivation, and that only limited acreage could be covered with a 4-row sprayer traveling at normal cultivating speed. In recent years, late infestation of cotton plants by various insects has also pointed more and more to the need for a sprayer that can be used in cotton of any height.

Early attempts at mounting chemical application equipment on a high-clearance vehicle consisted of installing a sprayer or duster on the chassis of a cotton picker tractor. This was readily accomplished by removing the picking unit and basket from the tractor and mount-

Presented at the 12th annual Cotton Mechanization Conference, Brownsville, Texas, August 13, 1958.

ing the applicator rig on the stripped-down machine. This practice did not prove too satisfactory, however, since many farmers preferred to convert their cotton picker tractors to standard tractors for other crop production jobs. In addition, not all makes of cotton pickers were capable of being modified to chemical applicators.

After several years of experimentation and trials under different field and crop conditions, the self-propelled, high-clearance machine finally has been accepted as standard equipment on many cotton farms in the alluvial and irrigated regions. The widespread interest in this new type chemical applicator is a result of its overall superior performance and its wide versatility, as compared with other ground and airborne machines. In addition to its serviceability in both early- and late-season insect control operations, it has proved capable of performing many other jobs. These include the application of liquid fertilizers, pre- and post-emergence chemicals and defoliants. Several manufacturers are also offering as optional equipment various cutting and seeding attachments in addition to spray, dust, and granular applicating equipment of all kinds.

Mechanization research engineers have also developed practical methods of installing and operating flame, mechanical, and late-season chemical cultivating equipment on high-clearance vehicles. These developments include a sweep cultivator that was modified and used successfully in cultivating tall cotton, corn, and sorghum at Stoneville, Mississippi, in 1956, and special flame cultivation equipment that has been adapted to high-clearance machines in California, Texas, and Mississippi in recent years.

Since many high-clearance machines are not powered with water-cooled engines, it was necessary to provide other means of vaporizing fuel for the flame burners. This

(*Continued on Page* 123)



Modified De Haviland Trainer Entering Agricultural Market

AN agricultural version of the English Chipmunk trainer demonstrated crop spraying from the air during the S.B.A.C. flying display at Farnborough, England (August 31 - September 7, 1958). This was the first public showing of the Chipmunk MK. 23, as it is called.

The new aircraft has a stalling speed of 33 m.p.h. and an exceptional degree of maneuverability, making it particularly suitable for the exacting demands of agricultural flying.

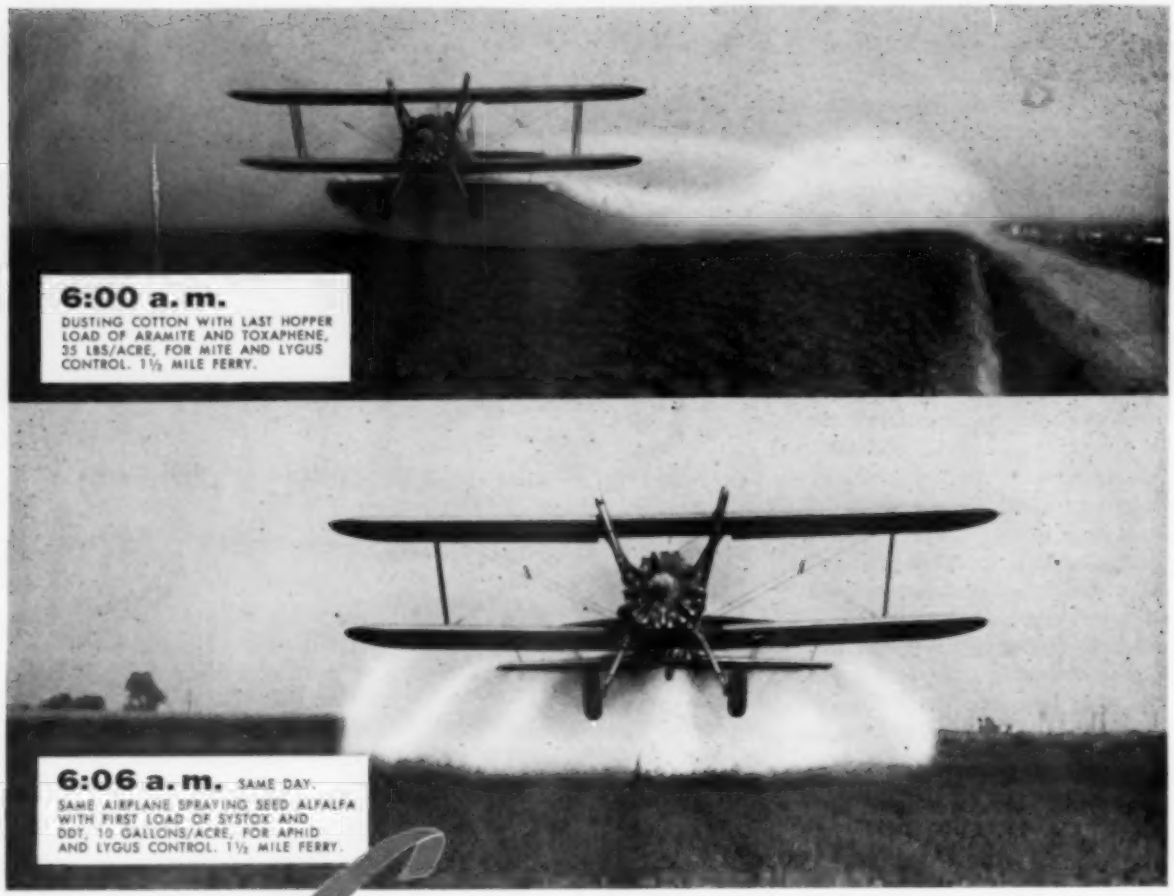
The D.H.C. 1 Chipmunk primary trainer was designed and manufactured by de Havilland Aircraft of Canada Ltd. and was subsequently built in large numbers in England for the Royal Air Force. It is powered by a de Havilland Gipsy Major 10 engine developing 145 b.h.p., well-known for its reliability. The new aircraft was produced by the de Havilland Aircraft Co. Ltd., Hatfield, Hertfordshire, England, in collaboration with Fison-Airwork Ltd.

The Agricultural Chipmunk is suitable both for liquid spraying and for dispensing solids. The spray bar for liquids and a chute under the fuselage for solids are quickly interchangeable. A hopper, made of fiberglass, is fitted in front of the pilot; it has a capacity of 14 cu. ft. and can be used for both liquid and solid chemicals. The hopper, which has a large lid for solids and a filler cap and filter for liquids, is designed to bear the load of a 100 pound sack being dumped on it.

The view from the Chipmunk's cockpit is exceptionally good, giving maximum safety during the low-flying spray run. The low-wing layout is also an asset because the spray bars are near the ground, thus ensuring a good penetration by the chemicals. The spray bar extends from wingtip to wingtip and produces a swath-width of more than 90 feet. This is a factor which greatly reduces spraying time, and makes the Chipmunk one of the most economical agricultural aircraft.

With its special fine-pitch propeller, it takes off in 200 yards with its hopper-load of 560 lbs. Stalling speed with half-flap for spraying is 44 m.p.h.at full load. When landing at light load with full flap. the stalling speed is reduced to 33 m.p.h.

As a safety measure, the plane is equipped with a stall warning device. The three operational controls are a windmill brake, a spray "on-off" cock and contents-jettison lever. The Chipmunk Mk. 23 can be equipped for night flying and with a full instrument panel.



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Ground Application of Herbicides in Cotton

by CARL H. THOMAS
Associate Professor
Louisiana State University

ALTHOUGH the author cannot speak for all of the states on the subject of the quantity of use of agricultural herbicides for weed control in cotton, it can be estimated that at least 25 per cent of the cotton acreage in Louisiana last season received at least one application of a herbicide.

In some instances, three applications of pre-emergence herbicide were applied on the same acreage including replanting twice, although this practice is not recommended by experiment stations. Fortunately, no serious injury was encountered on these areas.

In attempting a discussion of the application of herbicides in cotton, it would be best to break the subject into four phases, namely, pre-planting, pre-emergence, post-emergence, and lay-by or post lay-by applications.

At present, none of the experiment stations are recommending an application of pre-planting herbicide. The main pre-planting weed control measure appears to be mechanical, by deep turning of the soil to minimize the quantity of weed seeds at levels of germination. California, however, is presently interested in the use of a herbicide at the time of pre-planting irrigation. This tends to minimize the early weed problem by the germination of a large number of weed seeds prior to planting.

In the more humid areas with relatively medium or light soils, pre-emergence herbicides appear to be a major accomplishment in the control of weeds in cotton. These herbicides have not proven successful in heavy, buck-shot types of soils because of the extreme cracks that develop in the soil surface, allowing weed emergence without contact with a herbicide.

There are numerous means of applying pre-emergence herbicides. Basically, however, the spray solution is directed to a band centered on the planting drill with one flat fan, even-pattern nozzle per row. The application may be made separate from or in conjunction with the planting operation, with advantages and disadvantages being found in both methods. When made separate from planting, the planting operation goes faster, although it is extremely difficult to center the application on the drill. When the spray pattern is not centered on the drill, band cultivation becomes more difficult. When made with the planting operation, less total man-hours are required to get the two jobs done. When combined with planting and fertilizing operations, the man-hour requirements are further reduced. Other problems, however, increase. When a stop is necessary for one operation, the other two operations are stopped also. In addition, a skilled operator is required to handle these multiple-operation jobs.

A pre-emergence herbicide application usually is made on a 12 to 14 inch band, using 12 to 14 gallons of solution per acre. Broadcast applications tend to present the possibility of soil sterilization or build-up of undesirable soil characteristics with some agricultural residual types of chemicals, and the cost factor increases.

Successful pre-emergence herbicide applications are being made

(*Continued on Page* 131)

From a paper presented at the Beltwide Cotton Mechanization Conference, Aug. 12-14, 1958.

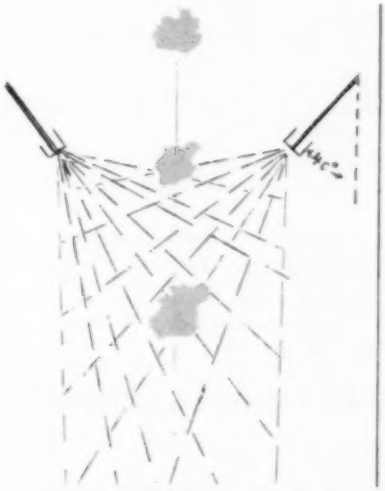


Fig. 1—Probably the most ideal two-nozzle arrangement is one in which nozzles are set at 40 degrees from the line of travel in a backward direction.

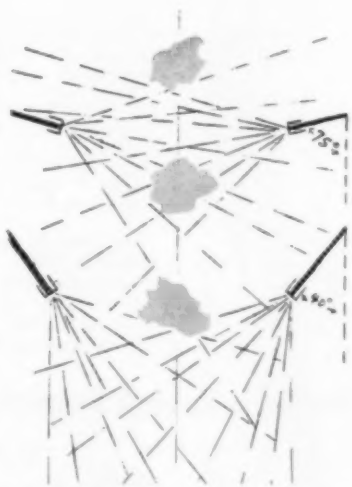


Fig. 2—A fairly compact spray pattern is achieved in this four nozzle arrangement with the forward nozzles set at 75 degrees from the line of travel.

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Aircraft Firms Join

Three new agricultural aircraft firms in California have joined the Agricultural Aircraft Association, Fresno, Calif.

They are the M and W Co. of Porterville, Calif., headed by R. W. Merritt and A. G. Wright; T.B.M., Inc. of Tulare, Calif., headed by Robert W. Moore; and C. B. Johnson Inc., Five Points, Calif., headed by C. B. Johnson.

•

Ground Applicators Course

The Washington Association of Ground Sprayers Inc., Seattle, held its Third Annual Ground Applicators Short Course in cooperation with the Department of Entomology, State College of Washington. The course was held at the Western Washington Experiment Station, Puyallup, Wash., Aug. 19-20.

The legal aspects of spraying were discussed by J. P. Felix, secretary-treasurer of the association. Larry Semler, Chief, Weed Branch, State Department of Agriculture, Yakima, outlined state regulations and commercial application of pesticides.

Vegetable insects were reported on by Dr. A. J. Howitt, Western Washington Experiment Station, Mount Vernon. The college's department of entomology staff closed the meeting with an informal session on identification of insects and diagnosis of injury caused by them.

Also at the meeting, the Washington Association held its election of new officers. George Mock was re-elected president and T. A. Ziegler and Robert Dye were named first and second vice-president, respectively. Board members elected were Ken Adams, Wallace Bartell, John Beheyt, Russell Faulkner, and Stan Raplee.

The association decided at its meeting that it will sponsor a short course itself and obtain instructors from industry as well as from experiment stations. No date has been set for this course as yet.

NATA Lists Schedule

A tentative schedule has been released by the National Aviation Trades Association, Washington, D. C., for its annual convention to be held Nov. 11 to 14 at the Pfister Hotel in Milwaukee, Wisc.

Sessions of interest to aerial applicators of agricultural chemicals will be held throughout the meeting, starting with an applicator breakfast on Nov. 12. A general applicator session will be held that afternoon followed by a program on applicator research.

Government applicator programs will be discussed fully and a session is planned that will be devoted entirely to applicator safety. Regulations for aerial applicators will be studied and two hours have been set aside for applicator business on the meeting's last day. All applicator sessions are scheduled to run concurrently with other NATA sessions. The first day's meetings, however, will be concerned solely with maintenance subjects.

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PEST ROUNDUP



By Kelvin Dorward

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is head — Plant Pest Survey Section, Plant Pest Control Branch, U. S. Department of Agriculture. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the U. S.

Corn Earworm Serious in Several Areas

BY late August there was a heavy increase in corn earworm moth activity in New Jersey. Trap catches during the week ending August 22 were several times those of the previous week. In Maryland, the worms were on the increase on both sweet and field corn and were expected to be serious on late corn. However, the pest was light on soybeans. One hundred per cent infestation was reported on late sweet corn ears in the Eastern Shore counties of Virginia. Up to 7 per cent of the whorls of field corn were damaged in Iredell county, N.C., this being the heaviest damage in recent years.

Corn earworm damaged grain sorghums in central and northern Alabama, in parts of Arkansas and Lea County, New Mexico. In the latter state corn ears were destroyed. Moth flights increased in Wisconsin during late August and damage was expected to late sweet corn. Iron County, Utah, had infestations in corn from 88-89 percent, with heavy infestations in most southern localities of the state checked. Scattered damage was reported from Torrington, Goshen County, Wyoming, but sweet corn in the Aberdeen, Idaho, area had 100 per cent infestation with many ears having 2 larvae. Infestations in the mid-Willamette Valley of Oregon were heavier than in 1957, and losses as high as 7% ear weight on graded samples were recorded. Yakima Valley, Washington, reported the heaviest damage from the corn earworm in the past 12 years. On July 26, 900 moths were caught compared with 10 for similar time and place in past years. The insect was also heavy on corn in the Walnut Grove area of Sacramento County, California.

The European corn borer during the latter part of August was causing damage in some areas. In New Jersey, although not heavy, late plantings of field corn were damaged. Some damage was reported from the eastern shores of both Maryland and Virginia. Johnston County, N.C. was infested for the first time in August, and heavy flights were under way the latter part of the month in northern Alabama. Although populations varied throughout Arkansas, one field of grain sorghum in Phillips County had 25 per cent of the heads broken open.

Egg mass counts of the European corn borer in southwestern Mississippi ranged from 20-200 per 100 stalks. Larvae were found in nearly all of the corn fields examined in 7 east central and 7 northeast Kansas counties. By the middle of August, egg mass counts on field corn reached or exceeded 100 per 100 plants in 10 per cent of the fields in Boone County, Iowa. Egg masses averaged 92 per 100 plants in field corn in north central Illinois. Although populations varied widely in Wisconsin, and moth flights were continuing into late August in four western counties, parasitism had killed 25 per cent of the larvae. Predation was responsible for a high incidence of larvae kill in the Wooster, Ohio, area. Due to late first generation development in Minnesota, it is not expected that the second generation will cause much damage. However in the Fargo area of North Dakota, some heavy infestations were found in sweet corn. Larvae counts in southeastern South Dakota averaged 288 per 100 plants, and 130 in the south central area.

Late August saw a continuation of damage by the fall armyworm in corn in parts of New Jersey, Delaware, Maryland and Virginia. Grain sorghum in central and north Alabama suffered considerable damage from the insect, and in northern Louisiana young corn was 100 per cent infested. Populations averaged 1 to 2 per young corn plant in Mississippi County, Arkansas. Populations were also reported from parts of Georgia, Oklahoma and Ohio.

The southwestern corn borer caused heavy damage in corn in localized areas of New Mexico and Louisiana, and was found in corn for the first time in Desha County, Arkansas. Although some increases were reported in the spotted alfalfa aphid, counts in general were low. The only areas reporting controls necessary in late August were Washington and Millard Counties, Utah. Continuing to spread in the east was the alfalfa weevil, which has been reported from Rhode Island for the first time.



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Fruit Insect Activity Generally Light

ALTHOUGH in general fruit pests were relatively light in late August, some damage was still being experienced. Mites were the principal concern, with some damage being reported from Massachusetts. Heavy populations were reported from parts of Colorado, Utah, Washington, Oregon and New Mexico.

In the Vincennes, Indiana, area codling moth injury in August in commercial orchards was the lightest recorded in eight years. Infestations were also low in Ohio orchards. The insect was locally severe in apple orchards in Washington and Millard, Utah. It was reported as medium on walnut trees in Riverside, California.

Other Insect Activity

AMONG truck and vegetable insects cabbageworms were perhaps the most active in late August. In localized areas of Oregon, broccoli and cauliflower carried heavy infestations. Populations of the loopers, up to eight per cabbage head, were reported from Orange County, California. Young cauliflower in the same area had an infestation of 2 to 5 per plant. Young lettuce in Dona Ana County, New Mexico, had medium to heavy infestations. Infestations in eastern Virginia were such that in August, it was predicted that this might be the worst looper year experienced in the eastern part of the state. Counts averaged 5 to 6 per cucumber leaf in the Virginia Eastern Shore counties. Flea beetles caused heavy damage to potatoes in Smith Valley, Lyon County, Nevada, and controls were necessary on potatoes in Garfield County, Colorado. Heavy localized populations were also reported from Utah, Virginia, Delaware and Massachusetts. Damaging populations of the Mexican bean beetle were reported in late August from Wyoming, Utah, Alabama and Delaware.

Among the cotton insects, bollworms were still very important during late August. Populations in South Carolina were still on the increase, with the build up the worst in several years. Infestations were on the increase in Alabama, with 50 to 75 per cent of the young terminals in Madison County being damage by young larvae. Larvae were present in most West Tennessee cotton fields, with large bolls being damaged. Moths were emerging in large numbers in Arkansas, and eggs were being found on all parts of the cotton plant. Controls were being applied for the cotton bollworm in several Missouri Counties, and untreated Oklahoma fields averaged 3 per cent infested bolls. Heavy egg deposition was recorded in the Mississippi delta counties, and infestation ranged up to 8 per cent in some Louisiana Parishes. The pest was generally light in Texas, except in several south plains counties; and under control in New Mexico except in some Hi-

(*Continued on Page* 137)

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LISTENING POST



By Paul Miller

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Mycology and Plant Disease Reporting Section, Plant Protection Research Branch, United States Department of Agriculture, Beltsville, Maryland.

Control of Root-Knot Nematodes by Soil Fumigation

ACCORDING to Bert Lear and D. J. Raski, University of California, root-knot nematode *(Meloidogyne incognita acrita)* is widespread and often causes loss in sugar beet fields in California. The nematodes are especially prevalent in light sandy soils in the southern part of the San Joaquin Valley, where sugar beets are frequently planted alternately with cotton. Damage is often severe in parts of the Sacramento Valley also.

The authors report results of experiments with various soil fumigants for controlling the nematode and reducing losses.

MATERIALS AND METHODS USED: Broadcast and row applications of D-D (1,3-dichloropropene and 1,2-dichloropropane), Telone (95 percent 1,3-dichloropropene), Nemagon (1,2-dibromo-3-chloropropane), and Soilfume 83 (83 percent ethylene dibromide by weight) were tried on experimental sugar beet plots. Broadcast applications were by chisel, 8 inches deep in rows 12 inches apart. Row applications were made with a single chisel per bed. After application, the treatment plots were cultipacked at once.

Root-knot gall counts on tomato plants grown in soil samples from the treatment plots were used to measure efficiency of the treatments. The soil samples were taken by soil tube to a depth of 18 inches. At harvest nematode damage to beet roots was estimated and yields were recorded.

Experiments were conducted at two places, Lamont in Kern County (San Joaquin Valley) and Woodland in Yolo County (Sacramento Valley).

In the Kern County experiment, the treatment plots each contained four single-row beds, 19 by 660 feet; each treatment was replicated four times. Soil was sandy. Fumigants were applied Jan. 8 to 10, 1957, when soil temperature was 38° to 45° F and soil moisture content between 3.67 and 5.46 percent. Seeds of sugar beet were planted 3 weeks after treatment. On May 15, 1957, six soil samples, three from each of the two center rows at 50-foot intervals beginning 100 feet from the end of the row, were taken from each plot. On September 17, 100 foot-sections of the two center rows of each plot were harvested by hand to obtain a yield record. Degree of root-knot damage to the roots was scored on a scale of 0 to 4.

The Yolo County experiment was on sandy loam. The plots contained three double-row beds, 10 by 75 feet. When the fumigants were applied on January 25 to 28, 1957, soil temperatures were 38° to 45° F. Seeds were planted one month after treatment, and soil samples were taken four months later. On September 25, the two rows of the center bed in each plot were hand-harvested for yield records, and the roots were rated for root-knot damage.

RESULTS: According to the counts of root-knot galls on tomato plants grown in the soil samples from the Kern County experiment, as well as the yield records and the estimate of root-knot damage to sugar beets, row applications of D-D, Telone or Nemagon were less effective than broadcast applications, at the dosages used.

Besides the increased yield of roots, there was a statistically significant increase in percentage of sucrose in beets grown on the treated plots. Beet plants in untreated plots collapsed suddenly after the last irrigation before harvest.

In the Yolo County experiment, good root-knot control and excellent yields resulted from treatment with Telone and D-D. The gall counts indicated somewhat better control from Telone than from equal amounts of D-D, but the exact dosages of these two materials for satisfactory results are not yet determined. It is hard to understand why Nemagon at one gallon per acre gave such poor results. Percentage of sucrose in beets grown on Nemagon-treated plots was significantly lower than in beets grown in all other plots, including the checks. The number of roots per plot was not significantly different in the Nemagon plot from

*Bert Lear and DD.J. Raski, "Control by soil fumigation of root-knot nematodes affecting sugar beet production in California", **Plant Disease Reporter**, Vol. 42, no. 7, pages 861-864, July 15, 1958.

the number in the other plots.

DISCUSSION: Increased yields of beets and sugar from the treated plots indicate that soil fumigation should be an economically practical procedure in sugar beet growing. Row application at correct dosages should decrease costs enough to make it possible for many additional growers to adopt soil treatment as a regular practice.

The rapidity and completeness with which sugar beet plants in the untreated plots in the Kern County experiment collapsed after the last irrigation suggest a connection between attack by root-knot nematodes and invasion by root-rotting organisms. The rapidity of the collapse especially, suggests that some organism other than nematodes was the actual cause of the root rot. A similar but less severe condition was observed in low-dosage plots where nematodes were controlled to some extent. ★★

•

N. Z. Aviation Growing

The chief activity of aviation in New Zealand is spreading fertilizer, according to a report on that country's aviation industry in The New York Times of Aug. 11.

Since 1950, aviation has been the nation's fastest growing industry. An agricultural country, New Zealand depends on animal farming. That requires frequent fertilization of pastures.

The switch to aerial spreading has developed since World War II. Today, about 45 per cent of all fertilizer is spread this way. Last year, more than 450,000 tons were dropped over 4,159,400 acres.

Out of 686 civil aircraft of all kinds in the country, 279 are engaged in agricultural aviation. The figure was more than 300 not long ago but dropped with the introduction of larger planes.

Aerial application of fertilizers is particularly adaptable to New Zealand because much of the farming country is steep and inaccessible. Planes have helped to bring into production large areas of former wasteland. It has been estimated that farming aviation has increased the national income by about $156 million.

The obsolete Tiger Moth aircraft, originally used, have been replaced by larger machines especially built for the purpose. Dakotas, carrying five-ton loads from civil airfields, are used in some areas.

•

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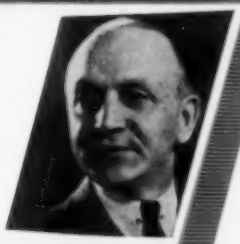
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Fertilizer Views and News



By Vincent Sauchelli

Dr. Sauchelli is Chemical Technologist for National Plant Food Institute.

Nitrogen-Phosphorus Relationships

DOES nitrogen help or hinder the uptake of phosphorus by plants? This question is of more than academic interest. It has a direct bearing on fertilizer management practices. In recent years, agronomists in many countries of the world have devoted much time and effort to the investigation of the influence of nitrogen on the phosphorus nutrition of crop life. The functions of nitrogen and phosphorus, as well as of each of the other nutrient elements, are coordinated and interdependent. If they are considered collectively, it must be remembered each is different.

Their interlocking effect is on one and the same plant, the objective being to cause a balanced development of all the plant tissues. The application of imbalanced amounts of nutrients can upset the normal growth of plants, which then finds expression in one function being overperformed while the others may be only partially carried out or not at all, depending upon the degree of deficiency of the nutrient element.

Mineral Uptake by Groups

In this column we have at times discussed "ionic balance" and "base or cation exchange." It is necessary to have some knowledge of these concepts to understand clearly how plants take up mineral nutrients through their roots. Base or cation exchange in plant feeding helps in predicting the mineral composition of a crop growing on a specific soil, since the exchange of cations between soil particles and plant roots can be regarded as an example of base exchange. Uptake of potassium, calcium, magnesium, sodium and perhaps some of the minor elements is essentially, therefore, a result of base or cationic exchange. The proportions of the several exchangeable cations in the root zone influence the amounts that are present in the plant. If the ratio of any two in the plant leaves is excessive or deficient, crop growth will be unduly limited and the feeding value of the herbage—if the crop is pasture or hay—to the livestock will be unduly lessened. It is known, for example, that a relatively excessive application of potassic fertilizers can induce a deficiency of magnesium in the herbage.

A Lesson from India

A most interesting application of the beneficial effect of the nitrogen - phosphorus relationship was made by an Indian scientist to the current economics of fertilization in that country[1]. Dr. Satyanarayana assembled many field data which reveal that an increased recovery of nitrogen in crop harvests occurred when nitrogen was used with superphosphate. For example, when 30 pounds of nitrogen were applied to paddy, only 4 to 9 pounds (14 percent to 30 percent) of the total applied nitrogen was recovered in the grain depending on soil type. When the same amount of nitrogen (30 pounds N) was applied together with 30 pounds of phosphoric anhydride (P_2O_5), from 19 percent to 53 percent of the applied nitrogen was recovered in the extra yield harvested. Hence, he emphasized in his comments that less nitrogen is lost and more is utilized by the crop when nitrogen is used jointly with phosphorus. In a country such as India, where nitrogen supplies are seriously inadequate, such field results pointed to a positive method of preventing waste of this costly nutrient element. The Indian authorities frown on the use of "straight" nitrogen unless adequate amounts of phosphorus are in the soil. This lesson should not be lost to other nations.

Other similar beneficial effects of the joint use of nitrogen and phosphorus can be cited from research in our own country and Canada. Dr. D. A. Rennie of the University of Saskatchewan[2] reported that nitrogen promoted uptake of nutrient phosphorus by cereal grains sown on fallow land. R. A. Olson and A. F. Dreier of the Nebraska Agricultural Experiment Station strikingly demonstrated in a series of field tests that yield increases for nitrogen and phosphorus, applied separately, were less than when the two nutrients were applied together. The elements complement each other. Nitrogen seems to stimulate roots to absorb phosphorus. R. Coleman[3] investigated the dif-

(*Continued on Page* 135)

(1) Efficient Utilization of Nitrogenous Fertilizers, P. Satyanarayana, "Fert-News," Vol. 2, No. 11, p. 8-11.

(2) D. A. Rennie & J. Mitchell, 1954, *Can. J. Agr. Sci.* 34, pp. 353-363.



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WASHINGTON REPORT



By Donald Lerch

YOU can expect increasing pressure of outside interests on agriculture and agricultural practices in the future. This is the lesson gained from the passage of the Humane Slaugher Law in the last session of Congress.

Humane Slaughter legislation has been introduced to Congress regularly over the past 25 years. Congressmen seldom paid any attention to it. Recently, however, the issue was taken up by a powerful women's group. Meetings were scheduled, talks were given, discussions were held, letters were written.

The women's activities started a groundswell of public opinion, based almost entirely upon emotion, which swept the bill through Congress. Nearly everyone, including farm organizations which—for the most part—opposed the bill, were astonished.

The most astonished single man in the country was a Senator who received 5,000 letters on the Humane Slaughter legislation; in the same week he received only three letters relating to the landing of American troops in Lebanon. Talks, discussion, and letters on Humane Slaughter among the women's groups were more effective in crystallizing opinion and causing action than hundreds of newspaper stories on our troop landings in Lebanon.

While the effect of this new law on agriculture is not likely to be very great, it demonstrates that non-agricultural people, particularly aroused women's groups, can force unwanted legislation in the agricultural field.

Until very recently we have not seen this trend in the United States. In France, however, consumer resentment after World War II resulted in taxes on farmers, which has led to a near disaster to French agriculture. French consumers got the idea that farmers had profiteered during the war. When war ended, consumers forced huge taxes on the farmers. One tax was 25 per cent and was put on the use of chemical fertilizer.

Farmers in the United States have been the subject of public sympathy because of their hard work, their excellent performance, their large numbers, and their strong farm organizations. So far they have not yet faced real public hostility. Dropping farm populations accompanied by skyrocketing urban populations is changing all this, however. Several legislators from primary urban areas have already started a campaign to reduce the influence of farm interests in Congress, on the charge that farm interests have been blocking progress in solving growing urban problems.

This means that companies doing business with farmers will have to take a hard look at what urban groups are thinking, saying and doing in respect to farm practices in which their products are involved.

Farm organizations have little or no knowledge about Industry's problems in manufacturing, distributing, and supplying products to agriculture. The pesticide industry alone is spending 5 to 6 times as much on research on pesticide chemicals as the government agencies. Industry is building up tremendous knowledge about these products, how they can be used, and what they will accomplish for farmers and for the general public.

From Washington it appears that more of the job of educating the general public to the benefits of the use of pesticides and other agricultural chemicals will have to be taken on by industry members themselves. There already are signs that public agitation about pesticides originating in New York can arouse opposition to some uses of pesticides even in states hundreds or thousands of miles away. The rapid expansion of the industry's sales, which is projected for the next ten to fifteen years, may well depend upon how well the general public is educated to understand and accept these chemicals as a beneficial part of agriculture and of American productive life.

* * * * *

Passage of the food additive bill by Congress this year is likely to affect agricultural chemical manufacturers in a somewhat unexpected way.

While exempting all pesticides already covered by the Miller Amendment, the food additive measure brings a host of new chemicals up for Federal Food and Drug Administration review.

Food and Drug officials are quietly elated over passage of the measure. Nonetheless, they are coming to realize that examining technical data on toxicity and setting tolerances where necessary on hundreds of new chemicals will put



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a tremendous burden on FDA facilities and manpower.

This could cause a logjam of major proportions starting around March next year, when the food additive law is slated to become effective. Pesticide manufacturers who already have to stand in a long line to present data and obtain tolerances may have to stand in a much longer line after that date.

While modeled somewhat after the Miller Amendment, the food additive amendment will have a much broader impact on the overall chemical industry. For the new law will bring all chemicals intended for use in producing, manufacturing, processing, preparing, packaging, transporting, or holding food under requirements similar to those affecting pesticides.

Pesticides, of course, are exempted from the food additive bill thanks to the fine presentation of facts to Congress on the subject by NAC. Even so, the products of agricultural chemicals such as growth regulants, defoliants, and dessicants not now under the Miller Amendment will be caught under the food additive measure, unless they are placed instead under Miller Amendment provisions.

To give you an idea of kinds of chemicals for which manufacturers will now have to conduct toxicity studies, present data to FDA to prove safety, and wait for tolerances to be set—here is an abbreviated list. These chemicals include antioxidants, mold inhibitors, rancidity prevention agents, and other preservatives, emulsifiers, stabilizers, extenders, colors, flavors, bleaching agents, thickening agents, and many others.

Food additives, generally recognized by the FDA and USDA as being safe, will be exempted from this measure, as will be accidental contaminants, which are covered elsewhere in the Federal Food, Drug, and Cosmetic Act.

(Continued on Page 133)



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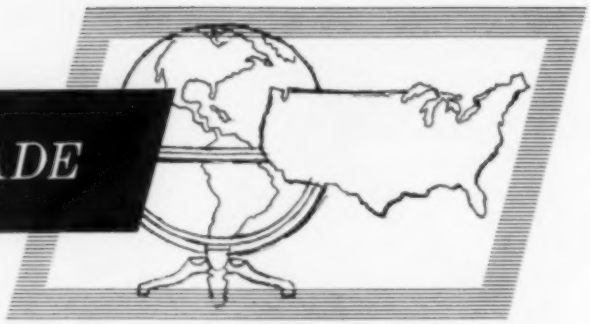
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NEWS about the TRADE



Offers Granular Am. Sulfate

The United States Steel Corp., Chicago, plans to market ammonium sulfate in granular form in certain areas of the midwest this fall. It will be the first time the company has offered the product, known as USS Granular Ammonium Sulfate.

The ammonium sulfate has become available as the result of the installation of facilities for its production at the coal chemical recovery plant of U.S. Steel's Gary, Ind., steel works.

The new facilities at Gary involve the compression of standard ammonium sulfate crystals. The recently-installed equipment includes two sets of compacting or compression rolls and three sets of granulating rolls together with auxiliary dryers and coolers.

•

Wilson Resigns As V-C Head

William H. Wilson resigned last month as president of the Virginia-Carolina Chemical Corp., Richmond, Va. He had been president since October, 1956.

The company's board of directors named Justin Potter president and re-elected him chairman.

•

Stauffer Plant For Eptam

The Stauffer Chemical Co., New York, is starting construction of a plant in Richmond, Calif., for the production of the selective herbicide, Eptam. It is anticipated that the plant will be in operation by January, 1959.

Eptam was developed by Stauffer's research laboratories in 1955. Chemically, it is ethyl di-n-propylthiolcarbamate, (E.P.T.C.). During the past three seasons it has been made in laboratory, pilot plant, and semi-commercial quantities. As a pre-emergence treatment, it has given excellent control of many grassy weeds and broadleaf weeds. Stauffer plans to market the herbicide as an emulsifiable liquid and in granule form for broadcast applications.

•

Glenn Renames Tabutrex

The Glenn Chemical Co., Chicago, has announced a change in the name of its insect repellent, formerly identified as Tabutrex. Effective this month, the new name for the repellent is "Tabatrex."

Soil Short Course

A soil fertility short course will be held at the Abraham Baldwin Agricultural College, Tifton, Ga., on Oct. 9.

•

Coop Plans New Urea Plant

Cooperative Farm Chemicals Association, Laurence, Kan., is expanding its present nitrogen producing facilities, and has awarded a contract to Chemical Construction Corp., New York. The facilities, to be completed by August, 1959, include a 30 ton/day urea plant and an ammonia plant with a rated capacity of 100 tons per day.

Hercules Repeats Boll Weevil Control Demonstrations

The Hercules Powder Co., Wilmington, Del., repeated its boll weevil-control demonstrations of 1957 on a much broader scale this season. The program was expanded to cover 100 farms in Louisiana, Arkansas, and Mississippi. Nearly 34,000 acres were involved.

In the opinion of most observers, the 1957 demonstrations in Louisiana showed that the boll weevil could be controlled with toxaphene and toxaphene-DDT used in a sound program.

The 1958 season was a difficult one for southern cotton farmers. Growing conditions were unfavorable and replantings were commonplace.

Field records for the 1958 crop indicate that insects also were a production problem. Practically every field in the program had one or more varieties of pests present. Damage was observed when the plants started forming squares, and insects continued to move into fields during the rest of the season. The boll weevil, however, was not as serious a problem as usual over the area involved in the program. Nevertheless, heavy damage was incurred and heavy infestations recorded in fields of some areas where farmers had not followed a cotton insect control program.

Severe bollworm infestations were reported in the majority of the cotton fields throughout the tri-state area. In addition, plant bugs and fleahoppers posed serious threats during the season.

The Hercules control program was essentially the same as that officially recommended in Mississippi and is based on the fruiting cycle of the cotton plant and the habits of cotton insects. Farmers cooperating in this program were able to set a crop despite the poor conditions.

Insecticide costs averaged $13.49 per acre, about 30 per cent under the 1957 costs.

Steltzer to AAC Post in Ohio

E. R. Steltzer has been named assistant superintendent at the Cincinnati plant of American Agricultural Chemical Co. He was formerly located at the AAC plant in Phoenix, N. Y.

•

New England Fert. Conf.

"Agricultural Development in a Changing Economy" was the theme for the annual New England Fertilizer Conference held at the Bald Peak Colony Club, Melvin Village, N.H., Sept. 24. W. B. Young, University of Connecticut, presided at the opening session, and Dr. W. H. Garman, NPFI Northeastern regional director, offered introductory remarks and welcome.

Speakers and their topics for the conference included the following: "Urban Industrial Development," Dr. W. C. McKain, Jr., University of Connecticut; "Future of New England Agriculture and the Fertilizer Industry," Dr. I. F. Fellows, University of Connecticut; "The Future of the Dairy Industry," Dr. T. M. Adams, University of Vermont; "The Future of Potato Growing," Dr. A. L. Perry, University of Maine; "The Future of Fruits and Vegetables," Dr. W. H. Drew, University of New Hampshire; and "The Future of Tobacco in the Connecticut Valley," Prof. P. L. Putnam, University of Connecticut. Dr. A. A. Spielman, University of Connecticut, presided at the afternoon session.

The program was arranged by the Northeastern members of the Institute in cooperation with the colleges in the area.

•

Potash Deliveries Down

Deliveries of potash for agricultural purposes in the United States, Canada, Cuba, Puerto Rico, and Hawaii by the eight American potash producers and importers totaled 3,392,569 tons of salts containing an equivanent of 1,978,636 tons K_2O during the period from July 1957 through June 1958, according to the American Potash Institute. This was a decrease of over five per cent under the preceding year.

Muriate of potash was the principal grade, comprising 93 per cent of the total agricultural potash delivered, while sulphate of potash and sulphate of potash-magnesia made up the remaining seven per cent.

•

Pesticide Exports Increase

Exports of pesticidal materials from the U.S. for the January-April period of 1958 were $30,390,528, an increase of 8.5 per cent over the same period in 1957. One of the largest increases, in DDT, is attributed to procurement programs of the International Cooperation Administration and World Health Organization, but also, in a lesser degree, to the upward price adjustment which occurred late in 1957.

•

Eastern Branch ESA to Meet

The Eastern Branch of the Entomological Society of America will meet Nov. 24-25 at the Lord Baltimore Hotel, Baltimore, Md. An innovation at this year's meeting is the absence of a scheduled program for the evening of the 24th. This evening is being left free for informal discussions.

Program highlights include: a talk by Bryan P. Beirne on the work of the entomological laboratory at Belleville, Ontario; a report on space travel and technology as related to entomology by Dale W. Jenkins, Fort Detrick, Md.; and a discussion on a national depository for insect collections by J. F. G. Clarke, Washington, D.C.

A separate committee on insects of shade trees and ornamentals is planned that will include: J. Peter Johnson, F. Ray Barron, Jr., John Weidhaas, John Naegele, T. W. Kerr, and Dale F. Bray.

Members presenting papers have been requested to provide the program committee with abstracts in advance of the meeting for distribution.

Haley Bill Fails to Pass

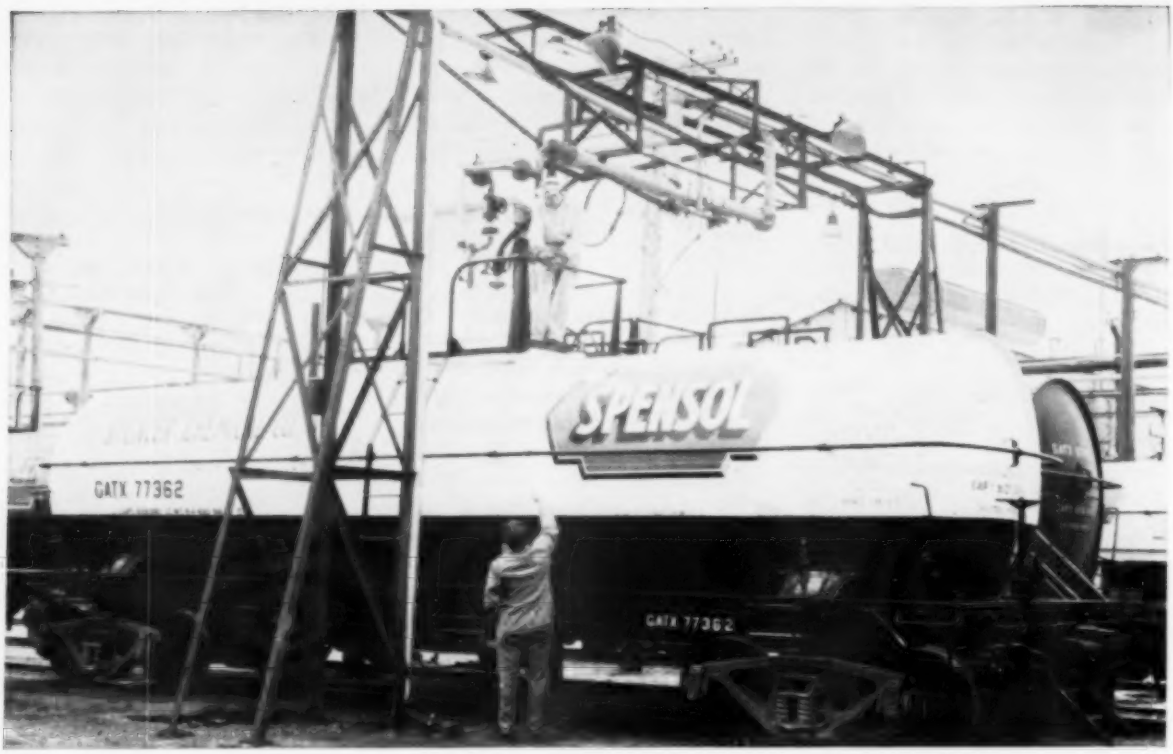
The Haley Bill (HR 9521) which sought to amend the definition of the term, "chemical preservative," as used in the Federal Food, Drug and Cosmetic Act, to exclude fungicides from classification as preservatives, failed to pass in the Senate before Congress adjourned last month. Introduction of the Haley Bill followed a ruling by the Food and Drug Administration that chemicals applied to raw agricultural commodities after harvest should necessarily be classified as "preservatives" and labeled as having been so treated when being offered for sale. The fresh fruit and vegetable industry had indicated that such a requirement would be impractical.

Introduction of Haley Bill, which passed the House, was intended to correct the situation, by redefining the term, chemical preservative, to specifically exclude fungicides and fungistats. The essence of the Haley Bill was the following paragraph:

> Provided further, that the provisions of this paragraph relating to chemical preservatives shall not be construed to apply to a raw agricultural commodity which is the produce of the soil, bearing or containing a fungicide or fungistat applied after harvest, while such commodity, having been received in a shipping container which bears labeling on such container declaring the name and function of such fungicide or fungistat, is held or displayed, in accordance with the custom of the trade, out of such shipping container.

The bill passed the house with no opposition from the Food and Drug Administration, and as a matter of fact it is reported that FDA officials expressed their regret that the measure failed to pass in the Senate before adjournment. This, it is stated, resulted from over-sight in the last minute rush to adjourn.

Officials of the United Fresh Fruit and Vegetable Association have expressed the hope that it may be possible to achieve the objectives of the Haley Bill through administrative action of the FDA,—or if



9 Reasons Why You Should Specify SPENSOL® GREEEN:

(Trademark)

From batching tank to tank car delivery, Spencer Chemical Company's careful planning pays off for you in nine different ways. Check these nine advantages and see what they could mean to your operation:

1 **Quality control** — double-testing in Spencer's Quality Control Laboratory makes sure the SPENSOL GREEEN you receive meets your exact specifications!

2 **Less corrosion** — SPENSOL GREEEN is 40% less corrosive, proved in corrosion comparisons of weight loss of mild steel test plates —and proved less corrosive in actual plant installations, too!

3 **Extra value** — because of overages — guaranteed full weight, and often *more* than full!

4 **Complete line** of solutions— many combinations of ammonia, ammonium nitrate and urea—custom made if you desire!

5 **Three plants,** strategically located for dependable delivery anytime, anywhere!

6 **Research** and pilot-plant work to help manufacturers of mixed fertilizer produce the best possible product in the most efficient way!

7 **Technical service** assistance by highly-trained experts experienced in plant design, equipment, and mixing!

8 **Double-check on weighing** to make sure that you pay *only* for the SPENSOL GREEEN you receive!

9 **Automatic credit** for any SPENSOL GREEEN remaining in the car you return to the plant!

Before you place *your* next order for nitrogen solutions, consider how much more you get when Spencer is your supplier.

SPENCER®

America's Growing Name in Chemicals

SPENCER CHEMICAL CO., Dwight Bldg., Kansas City 5, Mo.; District Sales Offices: Atlanta, Ga.; Chicago, Ill.; Memphis, Tenn.; Kansas City, Mo.; Works: Pittsburg, Kans.; Chicago, Ill.; Henderson, Ky.; Vicksburg, Miss.; Orange, Tex.

Insist on SPENSOL GREEEN (Spencer Nitrogen Solutions)

this fails, then through passage of a similar measure by both houses during the early days of the next session of Congress.

•

Fertilizer Volume Recovers

The July issue of the *Chemical and Rubber Industry Report* issued by the U.S. Department of Commerce states that there are indications that deliveries of fertilizer in May and June have helped greatly to overcome losses experienced during the early spring because of adverse weather conditions.

It is expected that in some areas the 1957-58 season will show an improvement over the preceding year, but in the Southeast consumption will probably be down.

•

PC&C Research Manager

Dr. Johnstone S. Mackay has been named manager - general research in the Research and Development Department of the Pittsburgh Coke & Chemical Co, Pittsburgh, Pa. He joined the company in 1952.

•

Royster Management Shifts

Charles F. Burroghs Jr., vice president-treasurer, and an officer in the F. S. Royster Guano Co,, Norfolk, Va., since 1945, has been named president of the company, succeeding his father, C. F. Burroughs, who was named chairman of the board.

Richard D. Cooke Jr. was named a vice president and continues as secretary. T. N. Gearreald, who joined the firm in 1954 as assistant treasurer, is now its treasurer.

•

U. S. Borax Strike Ends

A month-long strike ended early in September at the U.S. Borax & Chemical Corp., potash unit in Carlsbad, New Mexico. Full production was underway by September 5th, as employees started back to work after the Labor Day weekend.

The two locals of the International Association of Machinists voted to accept a company proposal for a new contract to run to May 31, 1960, that provides for a base pay increase of four cents an hour, effective September 1, with an additional four cents an hour, starting June 1, 1959.

•

Tom Morrison To Sales Post

Tom Morrison has joined Philipp Brothers Chemicals Inc., New York, in a sales capacity. Prior to service in the U. S. Army, he had gained experience in fertilizer production operations. Mr. Morrison is the son of Kenneth D. Morrison, vice - president of Philipp Brothers.



The company maintains offices in New York; Boston; Providence, R. I.; Baltimore, Md.; Philadelphia; Chicago; and Portland, Conn.

•

Sunshine Appoints Adams

The Sunshine Plant Food Co., Clovis, N. Mex., has appointed B. E. Adams as executive vice president and general manager. Mr. Adams' offices are in Dallas, Texas.

The company, which produces steer and sheep manure, has also appointed two new manufacturers representatives. Horticultural Marketers, Inc., Fort Lauderdale, Fla., and the Estes Co., Dallas, now represent Sunshine in their areas.

•

FDA Acts On Gibberellins

Gibberellins have been cleared by the Federal Food and Drug Administration for use on certain raw agricultural commodities, including: seed treatment of lima beans, snap beans, soya beans, and peas at the rate of 1/2 gram per 100 pounds. This treatment causes faster emergence. Also, the dipping of seed potatoes in a solution of 1 ppm gibberellins to break dormancy has been approved.

Food and Drug also accepted the spraying of Thompson Seedless and Black Corinth grapes with concentrations of 5 to 50 ppm at the rate of 5 to 50 gallons per acre for increased fruit set.

Technical bulletins and further information may be obtained by contacting Velsicol Chemical Corp., 330 East Grand Ave., Chicago.

Eastern States Terminal

The Eastern States Petroleum & Chemical Corp., Houston, Texas, opened its eighth terminal last month at Savannah, Ga. Other terminals are located in Chicago; East Liverpool, Ohio; Madison, Ind.; Brownsville, Texas; Carteret, N. J.; and Los Angeles

A complete line of the company's Espesol brand petroleum base aliphatic and aromatic solvents is carried by each terminal

•

Chemico To Build Plant

The Chemical Construction Corp., New York, has been selected to design and build ammonia and urea plants for the Cooperative Farm Chemicals Assn. in Lawrence, Kansas. The new plants will add to the cooperative's present nitrogen producing facilities there.

The ammonia plant, with a rated capacity of 100 tons per day, will be based on natural gas and will use the patented Chemico Gas Reform furnace for gas production.

The urea plant will produce 30 tons per day of urea for preparing urea-ammonia nitrate solutions.

•

U.S. Potash Shifts Pickering

Ben R. Pickering, sales representative for agricultural accounts in the northeast territory for the United States Potash Co., New York, has been reassigned by the company as sales representative for all industrial accounts.

Darrel D. Lowell has been named to succeed Mr. Pickerng as agricultural representative in the northeast. He joined U.S. Potash in July of this year.

•

New Prentiss Representative

Charles Albert Smith, Ltd., Toronto, Canada, has been appointed exclusive Canadian representative and distributor for the Prentiss Drug and Chemical Co., New York. The Canadian firm maintains sales offices and warehouses in Toronto and Montreal and has a western branch at New Westminister, B.C.

PENCO®

Agricultural Chemicals

COAST TO COAST



PENNSALT OF WASHINGTON DIVISION

PENNSALT CHEMICALS CORPORATION

TACOMA, WASHINGTON

Aurora, Illinois — Bryan, Texas

Menlo Park, California — Los Angeles, California — Montgomery, Alabama — Portland, Oregon

Seventh ARI Meeting

The seventh annual meeting of the Agricultural Research Institute will be held in the Academy of Sciences Building, Washington, D.C., on Oct. 13 and 14.

Ralph W. Phillips, U.S. Department of Agriculture, is scheduled to open the meeting with a report on agricultural research in foreign countries. A panel on problems relating to agriculture in the fertilizer producing industry will be moderated by Vincent Sauchelli of the National Plant Food Institute. The panel will be composed of M. B. Gillis, International Minerals & Chemical Corp.; Edwin Cox, chemist and chemical engineering consultant; and E. D. Crittenden, Allied Chemical & Dye Corp.

Another panel will discuss press relations in agriculture and agricultural research. Problems and needed research in soil and water conservation will be the topic for a third panel.

•

Radiation For Crops

In a session devoted to the use of radiation for crop improvement and genetics, and the preservation of foodstuffs at the Second United Nations International Conference on the Peaceful Uses of Atomic Energy at Geneva, Switzerland, Sept. 12, Dr. J. W. T. Spinks (Canada) the chairman, said the improvement of a plant strain could represent millions of dollars and that the irradiation of foodstuffs could help cut down the enormous annual loss through waste.

A successful barley, "Pallas," which has been produced by the radiation of another strain, "Bonus," was described by Professor A. Gustafsson (Sweden). Under actual agricultural conditions, the new strain retained all the virtues of the original barley with the advantage of a stiff straw.

A paper presented by Professor A. M. Kuzin (USSR) showed how radioactive tracer techniques gave detailed information about the protection of plants, which could lead to more effective pest control. By this method, it was possible to trace the insect migration in fields with cultured crops and in those overgrown with weeds.

•

Calspray Elects Grady V.P.

The election of Howard J. Grady to executive vice president and member of the board of directors of California Spray-Chemical Corporation was announced last month by A. W. Mohr, president, who stated that Mr. Grady will assist in the over-all management of the company at the head office in Richmond, Calif. For the past 10 years, Mr. Grady has served as Calspray's regional manager, marketing — east, with offices in Washington, D.C.



Howard J. Grady

Mr. Grady joined California Spray-Chemical Corporation in 1926 as a research entomologist. From 1931 to 1939 he served as Calspray's European representative, traveling extensively through Western Europe and North Africa, setting up plants and developing new markets for Calspray products. Returning to this country, Mr. Grady was named branch manager of Calspray's Portland office and later became manager of the Pacific Northwest Sales District. In 1948 he was sent to Washington, D.C., where he has remained to the present.

•

Deggendorf Joins Chemagro

C. D. Deggendorf has been appointed as a midwest sales representative by the Chemagro Corp., Kansas City, Mo. He will maintain his headquarters at Chemagro's regional sales office in St. Louis.

Formerly, he held sales positions with the California Spray Chemical Corp., and Wilson & Geo. Meyer & Co.

Du Pont Moves Sales Office

E. I. du Pont de Nemours & Co., Wilmington, Del., has announced that its Pacific Coast district sales headquarters for its nitrogen products section has been transferred from San Francisco to Los Angeles.

Marion N. Grady is continuing as district manager, and Dexter M. Thompson and Lawrence J. Munzenmaier are continuing as sales representatives for the southwestern and northwestern states, respectively.

•

Claxton Joins Agrico Staff

Charles T. Claxton has joined the staff of the Soil Service Division of the American Agricultural Chemical Co., New York. As a member of Agrico's staff of agronomists, he will interpret soil reports, make fertilizer recommendations, and assist in sales promotion.

•

WACA Meeting Oct. 14, 15

W. C. Jacobsen, director of the California State Department of Agriculture, will outline the problems of an agricultural regulatory agency at the 29th annual meeting of the Western Agricultural Chemicals Association, Oct. 14 and 15 at the Villa Hotel in San Mateo, Calif.

The action of gibberellins will be reported on with the aid of movies by Dr. J. M. Merritt, manager, plant chemicals, Merck & Co., Rahway, N. J. Frank C. Lamb of the Western Research Laboratory of the National Canners Assn. will talk about pesticides and the canning industry.

Dr. George R. Ferguson, president of Geigy Agricultural Chemicals, Division of Geigy Chemical Corp., Ardsley, N. Y., will review technological and economic trends in agriculture. E. T. Collinsworth, president of Velsicol Chemical Corp., Chicago, will discuss agricultural chemicals and the world market. Melvin Goldberg, Pesticide Advisory Service, N. Y., will talk on the outlook for agricultural chemicals.

Union announces a brand new line of I & C Baggers!



MODEL UB-201
(Dial Scale)

Compact, mobile machines save space . . . both gross-weigh and net-weigh automatically!

Union's new "200" series I & C Baggers for feed and fertilizer packaging can do practically everything but tell time. But they can *save* you time. And plant space. And labor costs.

Each of the new models is completely automatic. Here are some of the advanced design features and operational advantages they offer you.

Gross- to net-weigh...in seconds! Models UB-201 and UB-200 come equipped with valve gates which enable you to gross-weigh *and* net-weigh. You can change over from one operation to the other in seconds by flipping a "net-weigh" selector switch and installing a spout mounting and spout which clamps easily on to the machine.

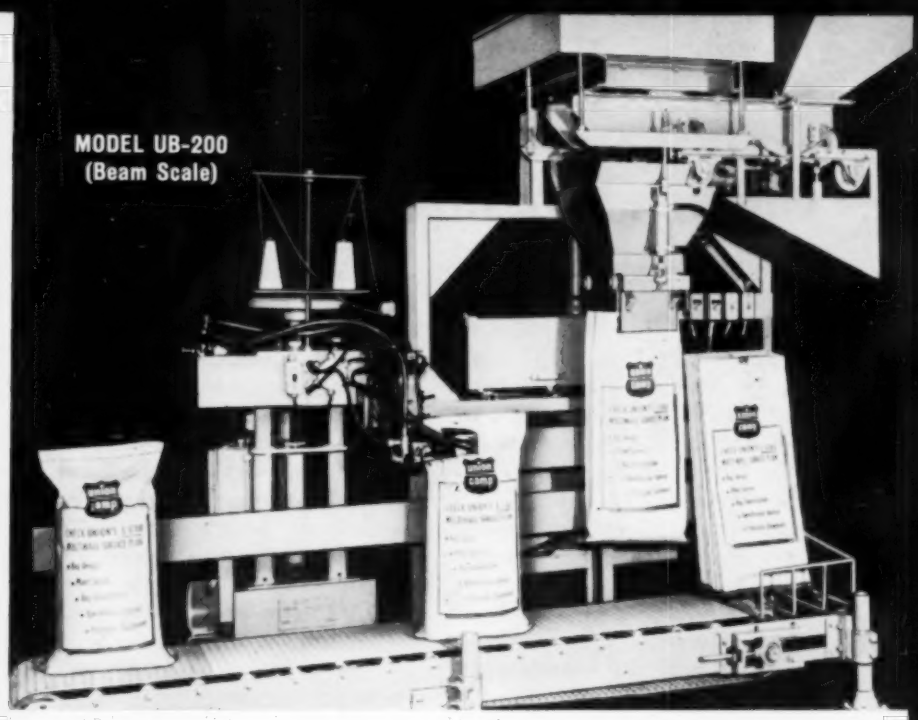
These new machines net-weigh 10 lb. through 50 lb. bags of granular fertilizer material and 10 lb. through 25 lb. granular feed material. As gross-weighing machines, they handle 80 lb. through 200 lb. granular fertilizer material and 25 lb. through 100 lb. feed material.

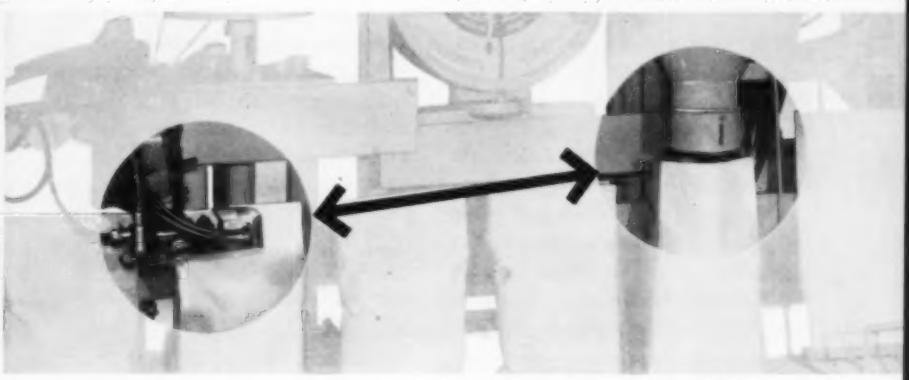
One-man or multiple-man operation. These new models are equipped with two mounting positions for the sewing head. When mounted closest to the bag filling point, one man can easily operate the bagger since the revolutionary new bag clamps free both hands to guide the filled bag through the sewing machine. When faster production is needed, the other mounting position allows space for an additional man to operate the sewing head.

Space savers. Union's new I & C Baggers are excellent space-problem solvers. Models UB-201 and UB-200 require only 3½′ x 5′ of floor space and only 7′ above the sewing head conveyor. They also are equipped with wheels, whether mounted on a conveyor or mounting frame. They can be moved easily for perfect alignment with other equipment or to meet changing plant conditions.

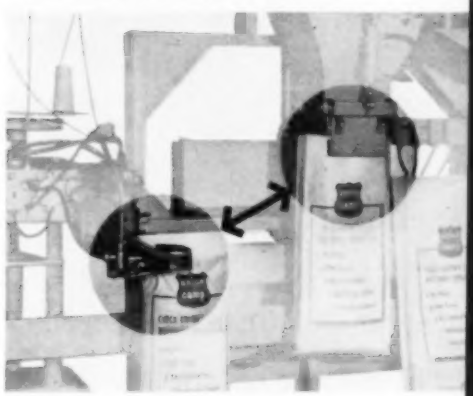
Consistently accurate. Whether you use them to net-weigh or gross-weigh, the new I & C Baggers maintain the same weighing accuracy that has made the "100" series famous throughout the feed and fertilizer industries.







Two mounting positions for sewing head allow for multiple-man operation (above) or one-man operation (below).



Complete installation service. Installation of the new I & C Baggers is fast and simple. The machine is delivered factory assembled and can be installed within 2½ hours. Union's installation engineers—located within easy reach of your plant—do the complete job including an engineering layout and instruction of your operating personnel—at a surprisingly low cost.

Write for full details about Union's new line of I & C Baggers for feed and fertilizer packaging.

Union's well-known "100" series I & C Bagger. If you require net-weighing up to 200 pounds, I & C Baggers—Series "100"—are recommended. We'll be glad to survey your packaging operation, help you determine which model best fits your needs.

UNION's I&C BAGGER

Automatic weighing and filling machine for open mouth bags.
Manufactured by Inglett & Company, Inc., Augusta, Georgia.

Exclusive Sales Agents:

UNION BAG-CAMP PAPER CORPORATION

Package Engineering Department, 233 Broadway, New York 7, New York

Security Analysts Touted On New Fertilizer Additive

A FERTILIZER additive, alunite, got considerable publicity last month when Paul Belmont, president of Hydrocarbon Chemicals, Inc., New York, addressed the New York Society of Security Analysts, August 22nd, and made some rather optimistic and perhaps ambitious predictions as to the potential market for the material in the fertilizer industry. "It is difficult", he said, "to see how, in the future, any fertilizer mixer can afford not to use alunite. Perhaps we can change the magic formula from NPK to NPKA."

It is possible, of course, that this rather extravagant prediction was designed more to sell stock than to sell alunite, for the material seems, in the north eastern part of the country at least, to be comparatively unknown as a possible fertilizer additive.

Calunite Corp. reports that several cars of alunite have been purchased by fertilizer mixers in the east and southeast, but apparently no alunite-containing fertilizers are yet on the market in this area.

Hydrocarbon Chemicals, through its subsidiary, the Calunite Corporation of Pomona, Calif., controls, Mr. Belmont stated, three-quarters of the known economically mineable reserves of replacement alunite in the U. S. Alunite is a double sulfate of aluminum and potassium, and contains also the trace elements, calcium, sulfur, magnesium, iron, manganese, boron, zinc, copper and molybdenum. The chief advantage in the incorporation of such a material as an additive in fertilizers is that, not being soluble in water, it does not leach out rapidly, but remains available during the complete growth cycle.

To support their claims on alunite the Calunite Corporation, who have offices in Mountainside, N. J., as well as in Pomona, Calif., and the milling plant in Marysvale, Utah, distribute a technical report whose principal feature is a series of perhaps two hundred "farmer testimonials". They indicate that the only state experiment station which has worked on the material to date is the Coastal Plains Experimental Station in Tifton, Georgia. However tests have been run for only four years and it will be one year more before the station will issue a report on its investigation of alunite.

Dr. Jackson B. Hester, who operates the Jackson B. Hester Agricultural Research Laboratories at Elkton, Md., analyzed alunite to evaluate the plant nutrients readily available for plant consumption and reported as follows:

> "Our analysis shows the elements in alunite to be available to the plant at a pH value and anionic and cationic concentration that is greatly influenced by the soil root plasma in much the same way as the human lung pH influence of the blood stream. With very minor exceptions, the trace elements in alunite are available to the root system and fulfill the requirements of most plants throughout the growing cycle.
>
> "Alunite is compatible with most commercial fertilizers and as a supplement will enhance the yield and improve the quality of almost every crop."

In his talk before the security analysts, Mr. Belmont quoted Homer B. Neville, Professor of Agronomy at the N. Y. State College of Agriculture, Farmingdale, L. I. as being "enthusiastic as to the potential" of alunite. Prof. Neville apparently has not conducted any conclusive test work on the material himself, but merely inspected some of the farms where the material had been used and reviewed the testimonials. The latter, incidentally, seem in many cases not to have been run under controlled scientific conditions. A substantial number of the tests were conducted on the basis of comparing calunite plots against no fertilizer application, rather than against non-calunite containing fertilizers. There were a substantial number of tests, however, which did compare calunite-containing fertilizers with other fertilizers, and in the results reported the users were generally enthusiastic as to increased yields obtained with the calunite-containing fertilizer, apparently attributable to its trace element content.

Analysis of alunite discloses the following elements affecting crops and soils:

calcium as CaO	.78%
sulfur as SO_3	17.98
magnesium as MgO	.14
iron as Fe_2O_3	1.22
manganese as MnO	.05
boron as B_2O_3	.002
zinc as ZnO	.03
copper as CuO	trace
molybdenum as MoO_3	trace
potassium as K_2O	4.75
aluminum as Al_2O_3	24.01

The potash content of alunite, incidentally, is largely in unavailable form. It is stated that "while this element apparently becomes available to the plant in time, no claims are made for alunite as a primary source of potash."

The investigation of alunite's possible role in agriculture began in 1947. Field testing started in 1955, in California, Texas, Arizona, Idaho, Washington, Virginia and Georgia. In 1956 and 1957, it is reported, 12,000 tons of mixed fertilizers containing alunite were distributed in the same area, analysis ranging from 1-9-1 to 12-16-8. Alunite is supplied as a coarse powder in which form it can readily be blended with granulated or pelletized materials. The Calunite Corp. emphasizes that it is only replacement alunite it claims to be an effective fertilizer supplement, not vein or pure alunite.

The company first attempted to sell an alunite-containing fertilizer direct to the farmer and home gardener, around the California

and far western area. "Calunite" is the firm's trade name for NPK fertilizer blended with replacement alunite (approximately 600 lbs. of alunite per ton). The attempt to introduce the product direct to the user ended in failure, with the company having exhausted its capital and in financial difficulties. The operation has since been taken over by Hydrocarbon Chemicals, of which Calunite Corp. is a subsidiary. Alunite will now be sold exclusively to fertilizer mixers, it is stated, with only limited sale direct to consumers, in an area around the plant site.

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To Discuss Law Enforcement

Changes in radioactivity of foods since the pre-atomic era will be reported at the 72nd meeting of the Association of Official Agricultural Chemists, to be held at the Shoreham Hotel, in Washington, D. C., October 13, 14, and 15. "Food Additives" will be discussed in the annual address of the president of the AOAC, Frank A. Vorhes Jr., of the Food and Drug Administration.

The AOAC was founded in 1884 to provide reliable methods of analysis required for the enforcement of pure food and drug laws and laws regulating the sale of other agricultural commodities such as fertilizers, feeds, and pesticides. At this annual assembly professional scientific workers in the Federal and State agencies, who are concerned with enforcing laws and regulations dealing with agricultural commodities, meet with the scientists of the regulated industries.

Methods of detecting minute residues of pesticides in foods, with special emphasis on rapid techniques to reveal overall contamination, will be described in a number of papers. The Food and Drug Administration has established safe limitations for residues of almost 100 chemicals on various fruits and vegetables. Improved methods of analysis facilitate the enforcement operations.

NW Chem. Meeting Jan. 21-22

The annual Northwest Agricultural Chemicals Industry Conference will be held in the Benson Hotel, Portland, Oregon, January 21-22, 1959. The conference chairman is George Kitzmiller of Pacific Cooperatives.

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Berkshire Moves NY Office

Berkshire Chemicals, Inc., on September 29th, moved its New York City offices from the former location at 420 Lexington Avenue to 630 Third Avenue. The new phone number is YUkon 6-8855.

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Plan New Research Center

The Diamond Alkali Co., Cleveland, has announced plans to build a multi-million-dollar, campus-style research center near Painesville, O. Plans call for construction of the project to be carried out in stages. The initial phase comprises a multi-unit group of buildings for central research and development.

IMC Names Dealers to New Advisory Board

The Four Leaf Phosphate Department of International Minerals & Chemical Corp. has named six fertilizer dealers as an advisory board to help expand its services to farmers and dealers in farm chemicals and fertilizers.

Describing the group, J. L. Mealy, sales manager for IMC rock phosphate, pointed out that "as the world's largest producer of agricultural plant foods, International sees this group as a 'grass-roots' approach to meeting farm and marketing problems of special interest to the dealer, distributor, and manufacturer of fertilizers. Dealers chosen have had long experience in the agricultural market, and their counsel will be most helpful."

The board includes William Edwards, Pontiac, Ill.; Lewis Flohr, Urbana, Ind.; Hugh Graham, Trenton, Mo.; James Prather, Tarkio, Mo.; William Parrish, Auburn, Ill.; and Rome Schwagel, Sharpsburg, Md.

At a two-day meeting held in IMC's new Administrative and Research Center in Skokie, Illinois, the board joined International specialists in discussing advertising, sales promotion, market research, and customer needs and motivations. The result was a program for dealers to include customer surveys, sales analyses, price and credit reports, advertising promotion plans, and other merchandising ideas to be reviewed by the board in semi-annual meetings.



Fertilizer dealers named to customer advisory board organized by Phosphate Minerals and Marketing Divisions of International & Chemical Corporation to expand IMC services to farmers and dealers, were welcomed at recent meeting.

Group included (left-right, standing) S. T. Keel, sales manager, phosphate minerals; J. L. Mealy, sales manager, rock phosphate; F. A. Koechlein, general manager, phosphate minerals; A. E. Cascino, vice president, marketing; N. G. Schenet, manager, sales services; James Prather, dealer and board member, Tarkio, Mo.; William Parrish, dealer and board member, Auburn, Ill.; and H. R. Haiden, assistant sales manager, rock phosphate.

Seated are Hugh Graham, dealer and board member, Trenton, Mo.; G. W. Moyers, IMC vice president, phosphate minerals; and three dealer-members of the group: Lewis Flohr, Urbana, Ind.; William Edwards, Pontiac, Ill.; and Rome Schwagel, Sharpsburg, Md.

IF YOU MAKE  HERBICIDES

PESTICIDES  ANIMAL FEEDS 

LET EASTMAN BE YOUR SOURCE

FOR THESE BASIC  CHEMICALS

For information, samples or specifications on any of the Eastman basic chemicals for use in herbicide, pesticide and feed production, write to any of the sales offices listed below.

Eastman
CHEMICAL PRODUCTS, INC.
KINGSPORT, TENNESSEE
subsidiary of Eastman Kodak Company

Herbicides and Pesticides

acetic acid
propionic acid
n-butyric acid
isobutyric acid
2-ethyl hexoic acid
2-ethyl isohexoic acid
ethyl alcohol
isobutyl alcohol
2-ethyl isohexyl alcohol
2-ethyl hexyl alcohol
isobutyronitrile
manganese sulphate (Tecmangam)
triethyl phosphate

Animal Feeds

Tenox BHT—Agricultural Grade: A form of BHT specially prepared for feed use—free-flowing, non-dusting, and granulated in a particle size comparable to that of other feed components. Protects vitamin content of feeds, improves pigmentation and protects chicks against deficiency diseases such as encephalomalacia.

Tecmangam: Contains 75-78% manganese sulphate. Completely soluble and readily assimilated, Tecmangam is an ideal source of manganese for feeds. In manganese-deficient areas, Tecmangam can be added to fertilizer to supply this essential element.

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; New York City; Framingham, Massachusetts; Cincinnati; Cleveland; Chicago; Houston; St. Louis. **West Coast: Wilson Meyer Co.,** San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

Lighter Drums Approved

The National Classification Board has moved to modify its rules relating to packaging of chemicals, acids, paints, and petroleum products so that the use and reuse of steel drums with 20 gauge walls and 18 gauge heads will be permitted starting next December.

This means that the chemical industry will be able to move to a lighter gauge 55-gallon, tight-head steel drum for multiple-trip use in the shipment of non-regulatory products by motor carriers. Current requirements call for 18-18 gauge drums. Looking ahead to the probable relaxation by the railroads of the single-trip restriction they now impose on use of the lighter drum, industry sources estimate that the change could mean an eventual savings of about $8 million annually to the industry. Improved manufacturing techniques are credited with eliminating a leakage problem previously associated with lighter drums.

•

Patent To Heyden Newport

A patent for a new group of herbicidal compounds has been granted to the Heyden Newport Chemical Corp., New York. The compounds are identified as trichlorobenzoic acid isomer mixtures, containing the 2,3,6,-isomer of the acid.

The potency of the compounds, the patent notes, can be attributed to synergism in that the total effect of the mixed isomers is greater than the sum effects of the 2,3,6,-isomer and the other isomers taken individually.

•

Joins Mississippi Corp.

John F. Babbitt has joined First Mississippi Corporation, Jackson, Mississippi, as vice president, effective September 1. For the past two years Mr. Babbitt has been assistant sales manager, responsible for domestic sales, of Chemical Construction Corp., New York. Prior to that, he had been associated with The Girdler Corp. Louisville, Ky.

Intl. Minerals & Chem. Corp. Opens Administration Center at Skokie, Ill.



The operation building (left) is connected to the administration building (right) by a one-story operations annex at the new Skokie, Ill., center.



The bright, open atmosphere of the IMC center is keynoted by the colorful employees' lounge located between the administration building and the cafeteria.

THE International Minerals & Chemical Corp., formally opened its new administration and research center on Old Orchard Road in suburban Skokie, Ill., northwest of Chicago, with a three-day open house reception Sept. 7, 8, and 9.

Facilities at the center include a five-story administration building, a three-story operations building, and three one-story buildings housing the cafeteria, employee lounge, and operations annex. All buildings are connected by multi-purpose units, including an electronic business data processing center and an auditorium-lounge. An enclosed walkway links the new structures to a one-story research center that was built on the site in 1951.

The IMC center is arranged in square units with central utility cores and reinforced concrete frames. Exterior walls of the administration and operations building are porcelain enamel steel panels and porcelainized aluminum mullions. Walls of the operations annex are of tapestry brick and glass panels.

The center has its own heliport, located atop its administration building, which is believed to be the first office building in the country with its own heliport incorporated in the original design.

Lewis Ware, IMC board chairman, described the center as a "symbol of IMC's first half century of progress and an appropriate setting for future corporate growth." The company started in 1909, producing phosphate and mixed fertilizer, and has grown from $5 million in annual sales then to more than $100 million now, with 90 per cent of that gain coming since the corporation moved its headquarters to Chicago from New York in 1941.

The new center at Skokie is located on a 21-acre plot of land adjoining on one side the Harms Woods Forest Preserve, one of a series of some 40,000 acres of natural woodlands ringing Chicago. The site was acquired in 1950 and construction started in December, 1956.

Six-hundred IMC employees work in the new center that is described as a new and unique concept in business environment. The buildings themselves incorporate every advantage of modern office construction, with maximum efficiency of arrangement providing 89 per cent usable space in the building's office floors. The center has a total gross square footage of 187,046.



Weevils can't tell hard water from soft . . .

Water makes a lot of difference to your concentrates. If your emulsifier blend gives you peak performance in soft water only, you may have stability problems in hard water . . . and you may hurt crops almost as much as insects.

Whatever the water . . . hard, soft or both . . . we can help you formulate for customer satisfaction and repeat sales. We've had a lot of experience in the practical application of emulsifiers to agricultural chemicals. We'll be able to lend a hand, in your lab and ours, to work out economical solutions tailored to your specific requirements.

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CHEMICALS DIVISION

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Brantford, Ontario, Canada

Producers of ATLOX Emulsifiers

Sedberry Adds to Staff

J. B. Sedberry, Inc., Franklin, Tenn., has announced the addition of Elias F. Joseph to its staff as a chemical engineer. The company, a manufacturer of grinding and pulverizing equipment, now offers engineering advisory service to the chemical industry.

Mr. Joseph had been connected with the Oak Ridge National Laboratory as a development engineer in pilot plant process development. His headquarters are at the company's Tyler, Texas, office.

•

New Position for Steinbruch

Robert Steinbruch has been appointed manager of contract research at Minerals & Chemicals Corporation of America, Menlo Park, N. J. In his new position Mr. Steinbruch will devote his activities to the utilization of M&C's research facilities for sponsored research and development work.

Mr. Steinbruch joined Minerals & Chemicals Corporation of America in 1954 in application research. He has been technical assistant to the director of research and most recently served in sales technical service in adsorbents and catalyst sales.

•

NREC Elects Thomas Cox

Thomas R. Cox, chief agronomist, American Cyanamid Co., New York, was elected chairman of the Northeastern Research and Education Coommittee, NPFI, at a meeting in New York, Aug. 22.

The committee met with representatives of the National Plant Food Institute and recommended that efforts should be concentrated on the development of effective fertilizer demonstration techniques and on better methods to utilize and promote demonstrations for optimum results.

In addition to naming Mr. Cox as chairman, the committee named Perry Onstot, Davison Chemical Co., Division of W. R. Grace & Co., as alternate representative to the steering body, and elected Dr. Willard H. Garman, Northeastern regional director of the National Plant Food Institute, as secretary of the committee.

•

Munson Sales Manager

T. Alan Powell has been named sales manager for the Munson Mill Machinery Co., Utica, N. Y. He joined Munson in 1936. He was named assistant plant superintendent following service in World War II and, in 1952, was made superintendent. Mr. Powell now is in charge of sales of Munson's equipment to the industrial, chemical and feed milling fields.



•

Sewell Is Elected Chairman

Harold G. Sewell, Toronto district sales manager for the agricultural chemical division of Canadian Industries Ltd., has been elected chairman of the plant Food Council of Ontario.

•

Hitchcock Joins Conn. Station

Dr. Stephen Hitchcock has joined the research staff of the Connecticut Agricultural Experiment Station, New Haven, where he will study insects attacking woodlands.

Special emphasis will be placed by Dr. Hitchcock on habits of the insects that make them pests. Dr. Hitchcock received his Ph.D. degree this year from the University of California, Berkeley, where he had been a research assistant in entomology for the past four years.

•

Bemis Specialty to New Plant

Bemis Bro. Bag Company has announced that its West Coast paper specialty department will soon be transferred to a separate plant in Fullerton, Calif. The department presently occupies space in the company's multiwall bag factory at Wilmington, Calif. C. C. Cobb, resident manager of the St. Louis paper specialty plant, will be resident manager of the new plant, which Bemis will lease on a long-term basis.

Davison Hi-Flo Line

The Davison Chemical Co. Division of W. R. Grace & Co., Baltimore, has adopted "Hi-Flo" as the trademark for its line of triple superphosphate products processed at Bartow, Fla.

The company offers Hi-Flo Gran-O-Lated triple superphosphate, Hi-Flo Run-O-Pile triple superphosphate, and Hi-Flo Blend-Phos triple superphosphate.

•

Pacific Guano Mix Mill

The Pacific Guano Co., Berkeley, Calif., has constructed a mix mill at Stockton, Calif., that turns out approximately 15 tons of agricultural chemicals and garden products daily for distribution throughout the Central Valley.

Requiring the services of just three men during the summer season, the mill mixes fertilizers, insecticides, herbicides, and field seeds which are sacked and shipped. Warehouse and office workers bring the plant's employee roster to eight. Offices occupy 1,200 square feet of the building's 96,000 square feet.

•

Spencer Signs Contract

The Spencer Chemical Co., Kansas City, Mo., has signed a new contract with Local 644, International Chemical Workers, AFL-CIO, bargaining agent for hourly employees at its Henderson, Ky., Works. The works has been operating without a contract since expiration of the previous agreement on July 31.

The basic change in the new contract is a provision for a six cent per hour "across the board" wage increase. Expiration date for the new contract is July 31, 1959.

•

Canadian Plant Operating

Dominion Fertilizers, Ltd., began production last month in Sherbrooke, Ontario, Canada. It is that township's first major industry.

The plant's staff is expected to reach about 22 men and the entire operation is controlled mechanically.


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Nopco know-how end formulating problems

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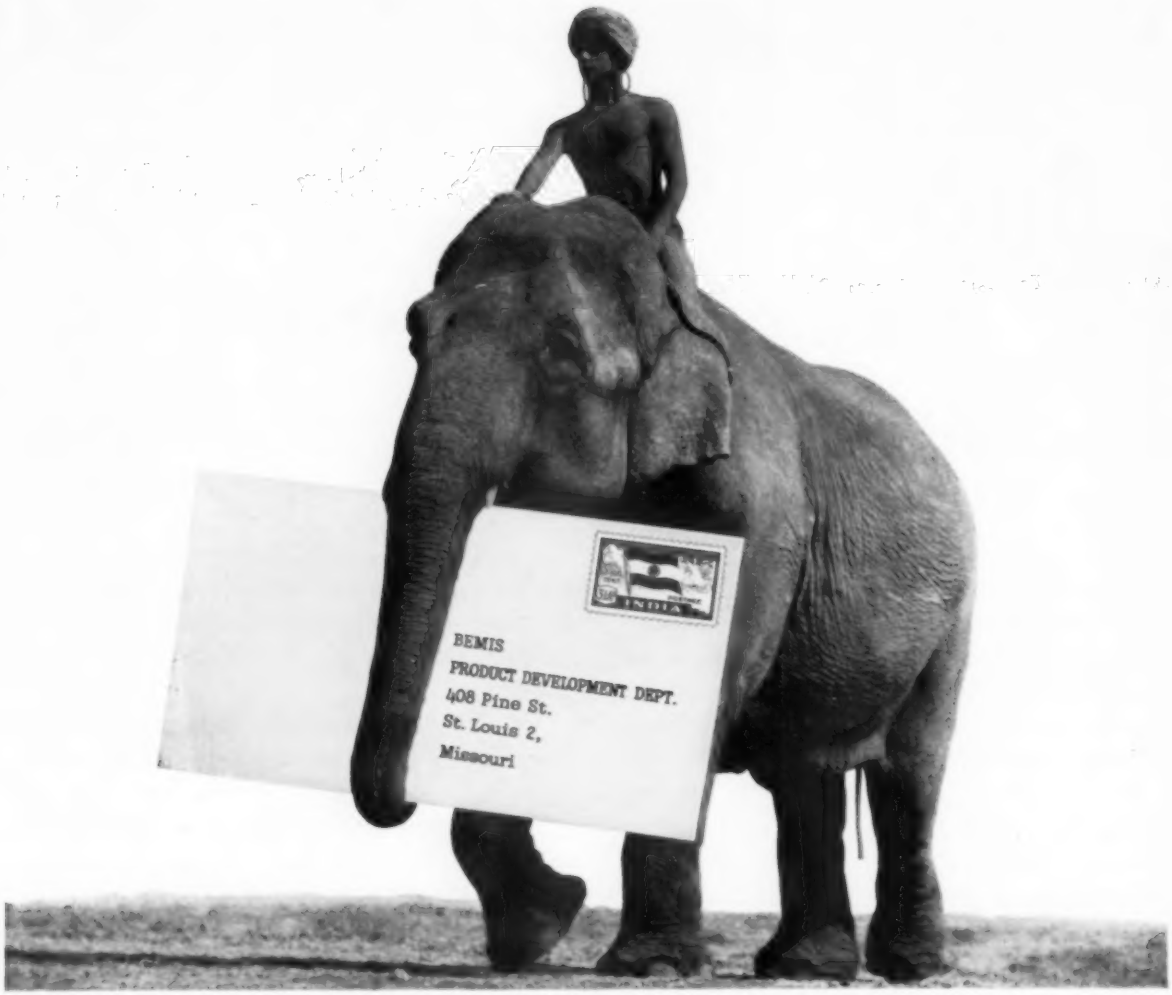
Detailed information, including time-tested formulas, is yours for the asking. And Nopco technicians stand ready to work with you—in strictest confidence—to help solve your specific formulation problems. Nopco Chemical Company, 60 Park Place, Newark 1, N.J.

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Almost everybody who brings problems to Bemis (where flexible packaging ideas are born) likes the flexible solutions that Bemis creates out of 100-year experience, skill and just plain flexible imagination.

12-WEEK TORTURE TEST!
Bemis Acid-Resistant Thread was buried 12 weeks in triple superphosphate, along with a widely used synthetic filament thread and two other leading competing brands. Bemis scored the same as the filament thread yet costs *less than half* as much! The other two brands scored far down in strength and, consequently, value.
For the *complete* story, write to the address shown above.



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Bemis may already be making the better package you need. Call, write, or ask your Bemis man.

Double Trithion Capacity

The Stauffer Chemical Co., New York, has doubled its capacity to produce Trithion, an insecticide-acaricide developed by the firm several years ago. Stauffer installed additional reactors at its Henderson, Nevada, Trithion plant to effect the increase in output.

The Henderson plant began producing last April but the demand for Trithion last season was greater than the plant could supply, according to Stauffer.

•

New Nitrogen Div. Process

The Nitrogen Division of Allied Chemical Corp., New York, is reported to have developed a new process that will enable fertilizer manufacturers to make high-nitrogen mixed goods without the use of dry nitrogen materials. Using only nitrogen solutions, manufacturers will be able to make mixed fertilizers with a nitrogen content as high as 16 per cent.

The new ammoniation technique, developed at Nitrogen Division's central research facilities in Hopewell, Va., involves the use of sulphuric acid with selected Nitrana nitrogen solutions. The process, which is continuous, can be used by fertilizer manufacturers who have granulating equipment. A certain amount of new equipment, plus modifications of standard ammoniating apparatus, are necessary, according to the division.

Nitrogen Division is offering the process to fertilizer manufacturers at no cost. Operating techniques, with guides as to type of solution, strength of acid, temperatures, and other factors have been worked out, the division said. Technical service men are available from the Nitrogen Division to assist with design and operation.

•

Fleck Joins Kraft Bag

George W. Fleck, recently with Union Bag-Camp Paper Corp., has joined the sales staff of Kraft Bag Corp., working out of Charlotte, N. C. He will cover most of North Carolina, South Carolina and Eastern Tennessee for both multiwall bags and the Kraftpacker Open Mouth Bag Filling Machine for which Kraft Bag Corp. is exclusive sales agent. The Company's main office is at 630 Fifth Ave., New York.

•

Union Bag To Acquire

The Union Bag-Camp Paper Corp., New York, has announced that it is negotiating to acquire all of the issued and outstanding stock of the Universal Paper Bag Co. of New Hope, Pa., a maker of multiwall paper bags.

•

IMC Honors Wilson

E. Meade Wilson, manager of the International Minerals & Chemical Corp.'s plant food operations in Florida and southern Alabama, was awarded a 25-year merit pin at a meeting of area managers in the company's new administrative and Research Center in Skokie, Ill.

Mr. Wilson joined International in 1933. He has been area manager since 1952. Besides being responsible for sales, he supervises IMC's fertilizer plants at Pensacola, Jacksonville, and Mulberry, Fla.

Expand W. D. Hannibal & Co.

W. D. Hannibal announces the recent incorporation of his Arizona and Nevada manufacturers representative's business, serving all of California, Arizona and Nevada. He brings into the new corporation Jack Terrell and Charles Grimshaw, veterans in the garden supply field. W. D. Hannibal and Co., Mt. Eden, Calif., specializes in garden, and hardware supplies, and power equipment.

The company presently represents the Bradson Company, Dobbins Division of Chamberlain Corp., Kelly-Western Seed Division's PAX Crabgrass & Soil Pest Control, Fold-A-Fence Corp., Lewis Standard Tools, and Procon Industries.

•

Named To Crag Staff

T. F. Fricke has been named to the Crag Agricultural Chemicals staff at White Plains, N. Y., by the Union Carbide Chemicals Co., division of Union Carbide Corp. Mr. Fricke will assist in the development and sales of Union Carbide's Sevin insecticide, which the company expects to market next year on a commercial basis.

Geigy Marks 200 Years as a Chemical Concern

GEIGY is celebrating its 200th anniversary this year. It is the oldest chemical firm in the world with a continuous record of progress in the chemical field. Nearly 20 years before the American declaration of independence, in the age of Voltaire, Rousseau, and Frederick the Great, Johann Rudolf Geigy, a merchant in Basle, Switzerland, set up his business in chemicals, dyestuffs, and drugs.

He thus became the founder of the firm which, under various legal forms, has kept the name of Geigy for 200 years.

The company entered the pest control field with the development of mothproofing agents to protect its textiles in the 1930's. In 1941, Dr. Paul Muller proved the insecticidal properties of DDT in the Geigy laboratories. The discovery was a turning point in the history of pest control. In 1948, Dr. Muller was awarded a Nobel prize for physiology and medicine.

Geigy has been represented in New York since 1870 with agencies that since have developed into a subsidiary company, the Geigy Chemical Corporation. As the parent firm continued to grow, its reorganization became imperative. In 1901 it was transformed into a limited liability company which, since 1914, has carried the name of J. R. Geigy S. A.

In connection with its bicentennial year, the parent company published a 125-page, illustrated booklet outlining the history of Geigy and reporting on its various activities around the world.



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32 plants of the A.A.C. Co., located in the United States, Cuba and Canada, with main office in New York, assure you dependable, fast deliveries of AA quality products for farm and industry. You can schedule your production with confidence . . . the right quantity and grade will be at your plant when you need it.

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Sulphuric Acid • Phosphoric Acid and Phosphates
Phosphorus and Compounds of Phosphorus

GENERAL OFFICE: 100 Church Street, New York 7, N. Y.

Calspray Branch Manager

John B. Clapp, Jr., has been named agricultural branch manager for the New England states by the California Spray Chemical Corp., Richmond, Calif. His headquarters are in Hudson, Mass.



Prior to his recent appointment Mr. Clapp had been a Calspray sales representative for three years.

•

Du Pont Adds Four Products

Four products have been added to the garden chemicals line of E. I. du Pont de Nemours & Co., Wilmington, Del. They are being unveiled at the National Hardware Show in New York's Coliseum, Sept. 29 to Oct. 3.

The new products are two specialty weed killers, a fungicide, and an insecticide-fungicide combination. The weed killers are Du Pont Chickweed Killer, based on neburon, and Du Pont Crabgrass Killer, based on amine methyl arsonates. The tomato and rose fungicide is based on "Manzate" maneb fungicide, and the garden spray contains methoxychlor and "Parzate" zineb fungicide. All four products are formulated for use in hose sprayers or other commonly used garden sprayers.

•

E. G. Kuhn Retires

The retirement of Edward G. Kuhn, president and general manager of the Consolidated Packaging Machinery Corp., Buffalo, N.Y., since 1943, and the appointment of Edward L. Kuhn as president and general manager were announced last month by the company's board of directors.

Edward L. Kuhn has been vice president in charge of sales since 1955. Among other items, Consolidated manufactures closing machines for multiwall paper shipping sacks.

•

Potato Field Day

The University of California will conduct a Potato Field Day on Oct. 10 at its campus in Riverside, Calif. A session on cultural problems will include a talk by Dr. Herman Timm, U. of California, Davis, dealing with seed piece size, spacing, and the gibberellins; and one by Dr. O. A. Lorenz, U. of California, Riverside, on the potato fertilizer program.

Dr. J. W. Oswald, Berkeley, will discuss scab, blight, and blackspot potato diseases in a diseases and insects session at the field day. New information on potato insect control will be divulged by Dr. L. D. Anderson, Riverside.

•

To Build Near Fresno

Valley Nitrogen Producers, Inc., San Francisco, plans to build a plant near Fresno for the manufacture of anhydrous ammonia, ammonia solution, and ammonium sulphate. Valley Nitrogen is a farmer cooperative.

Stauffer Appoints Cox

George A. Cox, Jr., has been appointed manager of the Stauffer Chemical Co.'s agricultural chemicals plant at Houston, Texas. He had been manager of the company's plant at Harvey, La.

•

Begin Construction In Dallas

The Magnolia Chemical Co., Dallas, Texas, has started construction of a factory, warehouse, and office building in the Brook Hollow Industrial District of Dallas. The new building will more than double the size of Magnolia's Dallas facilities.

A manufacturer of agricultural insecticides, among other products, Magnolia has warehouses in Lafayette, Ind.; Erie, Pa.; Tampa, Fla.; and Los Angeles, Calif.

Canadian Fertilizer Group Elects Allman

Dr. R. T. Allman was elected president of the newly-formed Canadian Fertilizer Association at its first annual meeting at the Manoir Richelieu, Murray Bay, Quebec, August 20 to 23. Dr. Allman is president and owner of the Bradford Fertilizer and Chemical Co.

In his opening remarks to the convention, Dr. Allman stressed the need for such a national organization as the new Canadian Fertilizer Association. Matters such as tariffs, transportation rates and legislative regulations are active problems facing our industry today, he said, and we will need the support of this Association in dealing with them.

In an address on recent revisions to the Fertilizer Act, C. R. Phillips, Head of the Fertilizer and Pesticide Unit of the Canadian Department of Agriculture, emphasized that, wherever pesticides are custom-mixed by fertilizer manufacturers, the use recommendations must be acceptable to the Department of Agriculture.

Another speaker, Dr. George R. Smith, Director of Chemistry of the Soils and Fertilizer Services of the Nova Scotia Department of Agriculture and the Nova Scotia Agriculture College pointed out the demands that will be made on agriculture in the future. Fifteen per cent of the farmers are producing 85% of the produce sold off the land in the U.S.A. and Canada, he said. Within the next 25 years in the U.S.A. and Canada, we must produce crops to supply 40 million more people. And this must be done on a smaller land area than at present, continued Dr. Smith.

"This job will be done by our good farm managers who will overcome the present limiting factors of low soil fertility and high soil acidity. And these farmers will use substantially increased quantities of fertilizers and lime," he concluded.

Dr. Russell Coleman, executive vice-president of the National Plant Food Institute was also in attendance at this first meeting of the new Canadian Fertilizer Association and listed what he felt are three barriers limiting the proper use of fertilizers today: A lack of knowledge about fertilizers . . . particularly their economic values; fear of using too much fertilizer and damaging crops; and lack of adequate credit for financing.

Chloro-IPC



(Photo courtesy *Arkansas Farm Research*)

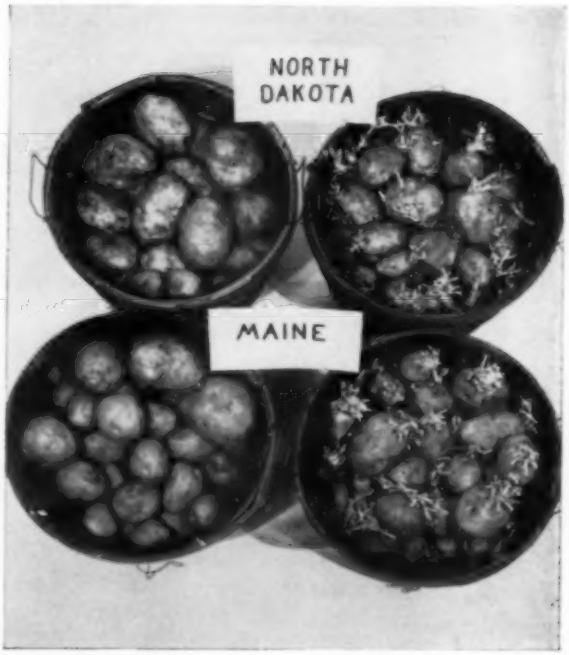
IN RICE. Untreated rice plot in Grand Prairie region (right, in picture) is infested with barnyard grass; Chloro-IPC treated plot (left) is free of infestation.



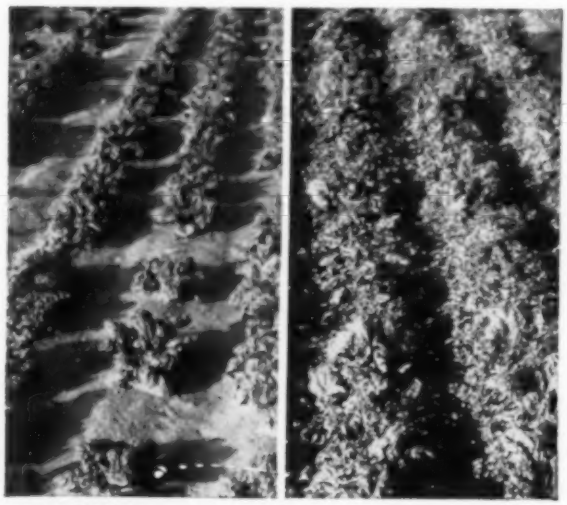
IN ONIONS. Untreated muck-grown onions (right, in picture) are choked by weeds; treated rows (left) show almost complete absence of weeds.



IN COTTON. Untreated cotton in field near Memphis (right foreground, in picture) shows heavy weed population; treated rows (left and rear) are comparatively free.



FOR POTATOES. Tubers stored at 65°F. show striking sprout inhibition achieved with Chloro-IPC treatment (left, in picture). Toxicological studies are well underway to establish a tolerance and allow acceptance of this application.



IN SPINACH. Untreated section of spinach field (right, above) is riddled with dense weed growth; treated section in same field (left, above) is virtually weedless.

emulsifiable concentrate now available direct from Columbia-Southern

Highly effective pre-emergence herbicide is formulated and packaged by pioneer producer

Chloro-IPC emulsifiable concentrate may now be purchased directly from Columbia-Southern Chemical Corporation, or through selected distributors. This new marketing policy automatically guarantees that *every* one, five, and 30 gallon container of herbicide contains material formulated and packaged in Columbia-Southern plants, under Columbia-Southern's rigid conditions of quality control. All containers are clearly identified as COLUMBIA-SOUTHERN CHLORO-IPC.

Crop applications still expanding

This complex organic compound, Isopropyl N (3-Chlorophenyl) Carbamate, was first successfully introduced into large scale cotton cultivation in 1953. It has since recorded outstanding field test results in weed and grass control for more than 40 other crops, ranging from rice to onions, apples to carrots, beans to kale. Recent research indicates effective applicability to Ornamentals and certain formerly sensitive crops. As noted at left, a striking new application shows great promise for sprout inhibition in stored potatoes.

Selective for annual grasses, Chloro-IPC gives remarkably economical pre-germination control of such undesirable plants as crab grass, chickweed, purslane, pig weed, annual morning-glory, smartweed, wild oats, foxtail, spurry, and a number of other grasses and broadleaves indigenous to various growing areas.

Columbia-Southern Chloro-IPC contains 4 pounds of active ingredient to the gallon. Mixing readily with water, the formulation emulsifies without vigorous agitation and will not clog spray nozzles. It is generally safe to re-apply Chloro-IPC without fear of toxic build-up to replanted crops or crops planted the following year. This wide margin of safety distinguishes Columbia-Southern Chloro-IPC from most other pre-emergence herbicide formulations.

Great savings realized

Greatest savings occur with crops that would otherwise require extensive hoeing or other costly cultivation practice, such as hand weeding. Cotton, onion, and spinach growers have reported savings of from $5 to $100 per acre as against hoeing costs for non-treated stands. Fertilizer costs are lessened, too, as more of the plant food goes to crops rather than to weeds. With much hand labor eliminated, mechanization programs become far more economic.

What's ahead in new uses

Continuing research, often cooperatively conducted with USDA and state university experimental stations, indicates highly promising additional uses for emulsifiable and granular forms of Columbia-Southern Chloro-IPC. As these crop uses prove economically practical, results will be announced by Columbia-Southern.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION
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DISTRICT OFFICES Cincinnati, Charlotte, Chicago, Cleveland, Boston, New York, St. Louis, Minneapolis, New Orleans, Dallas, Houston, Pittsburgh Philadelphia, San Francisco IN CANADA Standard Chemical Limited

Pacific Coast Names Two

The Pacific Coast Borax Co. Division of the United States Borax & Chemical Corp., Los Angeles, has announced the transfer of J. M. Nunn to Jackson, Miss. Mr. Nunn, who has worked out of the company's Dallas and Amarillo offices during the last six years, will cover the tri-state area of Arkansas, Louisiana, and Mississippi for Pacific Coast's agricultural sales department.

At the same time, the company announced the addition of B. L. Patrick to its agricultural sales department. Mr. Patrick will cover North Central Texas and Oklahoma for the company. He formerly was with the sales department of Armour and Company.

•

New Smith-Douglass Managers

E. Burton Peacock, has been appointed manager for the Smith-Douglass Wilmington, N. C. operation, the company announced from its Norfolk, Va. home office. Mr. Peacock was formerly manager at Kinston, N. C. where he will be succeeded by Walter Stroud, Jr. Smith-Douglass operates plants serving sales territories at both Wilmington and Kinston.

E. Kendall Eakes, Rocky Mount, N. C. has been named sales assistant to M. W. Darden, manager of the Smith-Douglass Norfolk branch. John R. Dalrymple, who has been Wilmington manager, will be transferred to Norfolk sales at Rocky Mount, N. C.

•

Frederick B. LaForge Dies

Dr. Frederick B. LaForge, well known chemist in the U.S. Department of Agriculture, died last month in Washington, D.C., following a long illness. He was 76.

Dr. LaForge joined the U.S.D.A. in 1915. He conducted studies of rare sugars and was the first to find a 7-carbon sugar in nature, a discovery that proved important in connection with the synthesis of carbohydrates. He also developed and patented a method for the production of furfural from corn cobs. In 1923 he received the Hillebrand award from the Chemical Society of Washington as co-discoverer with Dr. H. L. Haller of the molecular structure of rotenone. Following this he investigated the chemistry of pyrethrum and, in 1948, he developed with his co-workers, M. S. Schechter and Nathan Green, a method for the synthesis of pyrethrum-like esters. Dr. LaForge retired from government service in 1952.

•

Mgr. of Stauffer Bayonne Plant

Robert M. Peters has been appointed plant manager of Stauffer Chemical Company's agricultural chemicals plant at Bayonne, New Jersey.

Mr. Peters, who holds a bachelor's degree in chemical engineering from the University of North Carolina and a master's degree from the University of Minnesota, joined Stauffer in 1952. He was formerly manager of the company's agricultural chemicals plant at Houston, Texas.

AP&CC Plant On Schedule

The sodium chlorate plant of the American Potash & Chemical Corp. being constructed at Aberdeen, Miss., is expected to begin production late this year according to schedule.

The plant, being constructed principally to supply chemicals to the southern pulp and paper industry, is located on a 770-acre site on the Rombigbee River ten miles south of Aberdeen. Initial production capacity will be at the rate of 15,000 tons of sodium chlorate per year. The plant is expected to supply chlorates to herbicide manufacturers also.

•

It's Phosphamidon

In our report on new pesticides for orchard pests (September, *Agricultural Chemicals*, page 27), we incorrectly identified one of the new pesticides as "Phosphadrin." This should have been reported as "Phosphamidon" which is offered by California Spray Chemical Corp., Richmond, California.

Gervan Succeeds Campbell as G. L. F. Secretary

Election of R. Gervan as secretary of Cooperative G.L.F. Exchange, Inc., was announced late in August. He succeeds M. E. Campbell, who retired August 31. Mr. Gervan, assistant to the general manager since last December, will continue duties for that post.

Mr. Gervan joined G.L.F. in 1938 after four years with Agricultural Advertising and Research. He established the G.L.F. advertising department, was first general manager of Rural Radio Network, and is now president of Northeast Radio Corporation, G.L.F. subsidiary operating a commercial FM network in upstate New York.

Mr. Campbell is retiring from the Exchange after 36 years of service. While still managing his own dairy farm in northern Pennsylvania in 1922, Mr. Campbell became acquainted with the newly organized G.L.F. cooperative and called on neighbors to join. He eventually spread the G.L.F. word and organized membership throughout several Pennsylvania counties.

Mr. Campbell opened the first G.L.F. office in New York City in 1929 and developed wholesale and retail distribution in the metropolitan area, including southeastern New York, northern New Jersey and Long Island. He also operated a feed mill on the East River in New York City, a Barge Canal terminal in Brooklyn and a fertilizer warehouse at Port Newark, New York.

He was elected secretary of G.L.F. by the board of directors in 1953 and continued in this capacity until the present time. He has also been a member of the G.L.F. Retail Service Board and a director of Northeast Radio Corp., a subsidiary of G.L.F.



Appearance may be improved through better design, sharper color printing, reproportioning, or better choice of outside wall.

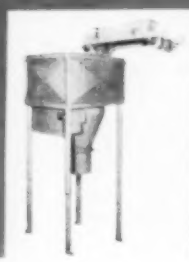
A frank discussion with us may result in a more attractive bag, reduced production costs and increased sales of your product.

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will handle any free-flowing material f-a-s-t-e-r, with more accuracy, than any bag filling machine of its type!



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Union Carbide Shifts Three

Three transfers of Crag agricultural chemicals sales representatives have been announced by the Union Carbide Chemicals Co., Division of Union Carbide Corp., New York.

J. R. Wheatley will cover the Mississippi Delta from headquarters at Memphis, Tenn. J. D. Mueller moves to Yakima, Wash., and T. P. Finn has transfered to Grand Rapids, Mich. Mr. Mueller and Mr. Finn will cover fruit growing areas and Mr. Wheatley will call on cotton pesticide formulators and experiment stations.

Farm Demonstrations Basis of Cotton Pest Program

by P. J. Reno
Hercules Powder Co.
Wilmington, Del.

This is the final of the observations on the 1958 pesticide season starting on p. 30-34.

1958 will go down on the books as a year of great progress for the adoption at the farm level of a complete planned cotton insect control program.

Farm demonstrations of a complete control program were carried out by Hercules and by several others throughout the humid cotton belt from Texas eastward to the Atlantic. Insect conditions were considerably different from those encountered in the 1957 Hercules demonstrations, but the results were no less dramatic. We confidently expect this concept of a sound planned program as contrasted to emergency operations will continue to expand throughout the cotton belt. The farmer will benefit from the lessened risk involved in growing cotton; the industry will benefit from the steadier demand for its products. The industry, however, must contribute by providing sound, on-the-spot guidance for the cotton farmer.

Toxaphene was in a short supply position for about six weeks during the height of the season, due to heavy demand from domestic formulators. Measures are being taken in an attempt to avoid a recurrence of this situation during next season.

The increase in high-grade cotton acreage expected to result from the new farm bill should have a beneficial effect upon our industry next season. With the demonstrated value of sound insect control, even during a poor boll weevil season such as we have just experienced, we look forward to the future with a great deal of confidence.★★

Industry Meeting Calendar

Sept. 29-Oct. 3 — National Hardware Show, Coliseum, New York.

Oct. 13—Agricultural Research Institute, Panel on Problems Related to Agriculture in the Fertilizer Producing Industry. Academy of Sciences Building, Washington, D. C.

Oct. 14-15 — Western Agricultural Chemicals Association Annual Meeting, Villa Hotel, San Mateo, Calif.

Oct. 16—National Plant Food Institute Conference on Chemical Control Problems. Shoreham Hotel, Washington, D. C.

Oct. 17—Association of American Fertilizer Control Officials, Shoreham Hotel, Washington, D. C.

Oct. 20-24 — Farm Safety Sessions, 46th National Safety Congress and Exposition, Hamilton Hotel, Chicago.

Oct. 20 — Annual Sales Clinic of Salesmen's Assn. of the American Chemical Industry, Inc., Roosevelt Hotel, New York.

Oct. 22-24—Pacific Northwest Plant Food Assn., Gearhart, Oregon.

Oct. 28-29—Northwest Garden Supply Trade Show sponsored by the Oregon Feed and Seed Dealers Assn., Portland, Oregon.

Oct. 29-31 — National Agricultural Chemicals Association, General Oglethorpe Hotel, Savannah, Ga.

Oct. 29-31 — Eighth annual meeting of the Entomological Society of Canada and the 95th annual meeting of the Entomological Society of Ontario, Guelph, Ontario.

Oct. 30 — Southeastern Fertilizer Conference, Atlanta Biltmore Hotel, Atlanta, Ga.

Nov. 5-7—Fertilizer Industry Round Table, Mayflower Hotel, Washington, D. C.

Nov. 9-10 — California Fertilizer Assn. 35th Annual Convention, Ambassador Hotel, Los Angeles.

Nov. 10-11—Agricultural Aviation Research Conf., Milwaukee, Wisc.

Nov. 11-13—20th Annual New York State Insecticide and Fungicide Conference and 11th Annual Pesticide Application Equipment Conference, Bibbins Hall, Cornell University, Ithaca, N. Y.

Nov. 11-14—Annual Meeting, National Aviation Trades Assn., Pfister Hotel, Milwaukee, Wisc.

Nov. 13-14 — Canadian Chemical Specialties Manufacturers, Queen Elizabeth Hotel, Montreal.

Nov. 16-18—National Fertilizer Solutions Assn., Netherland Hilton Hotel, Cincinnati, Ohio.

Nov. 19-20—Annual Meeting, Carolinas-Virginia Pesticide Formulators Assn., Carolina Hotel, Pinehurst, N. C.

Nov. 20-21—Commercial Chemical Development Assn., joint meeting with representatives of the NACA, Lord Baltimore Hotel, Baltimore, and Beltsville, Md.

Nov. 24-25—Eastern Branch, Entomological Society of America, Lord Baltimore Hotel, Baltimore.

Dec. 1-4—Entomological Society of America, Sixth Annual Meeting, Hotel Utah, Salt Lake City, Utah.

Dec. 3-4—North Central Weed Control Conference, Netherland Hilton Hotel, Cincinnati.

Dec. 3-5 — Agricultural Ammonia Institute, Annual Meeting, Morrison Hotel, Chicago.

Dec. 9-11—Chemical Specialties Manufacturers Assn., Annual Meeting, Commodore Hotel, New York.

Dec. 17-18 — Beltwide Cotton Production Conf., Rice Hotel, Houston, Texas.

Dec. 28-30—American Association for the Advancement of Science, 125th Annual Meeting, Washington, D. C.

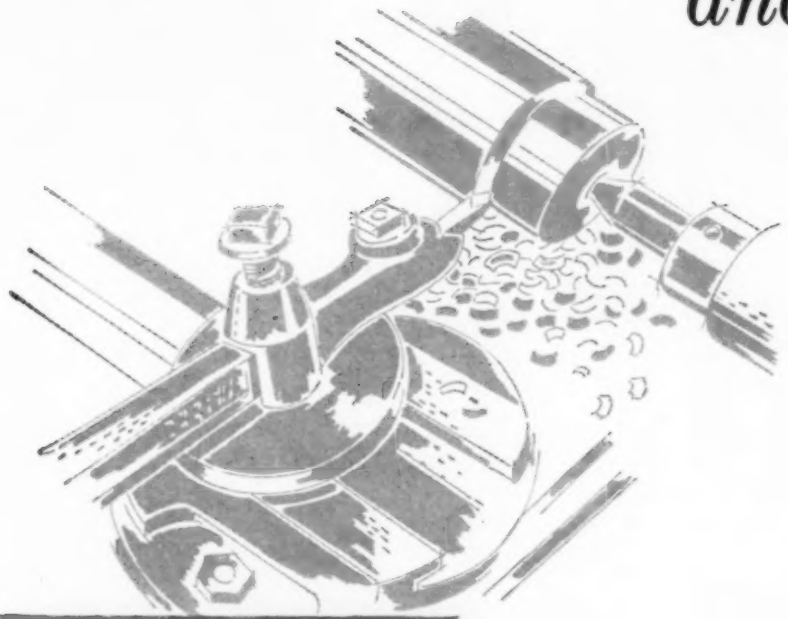
Jan. 7-9 — Northeast Weed Control Conference, Hotel New Yorker, New York.

Jan. 21-22—Northwest Agricultural Chemicals Industry Conference, Benson Hotel, Portland, Ore.

Jan. 20-22, 1959 — California Weed Conference, Santa Barbara, Cal.



SULPHUR *and* STEEL





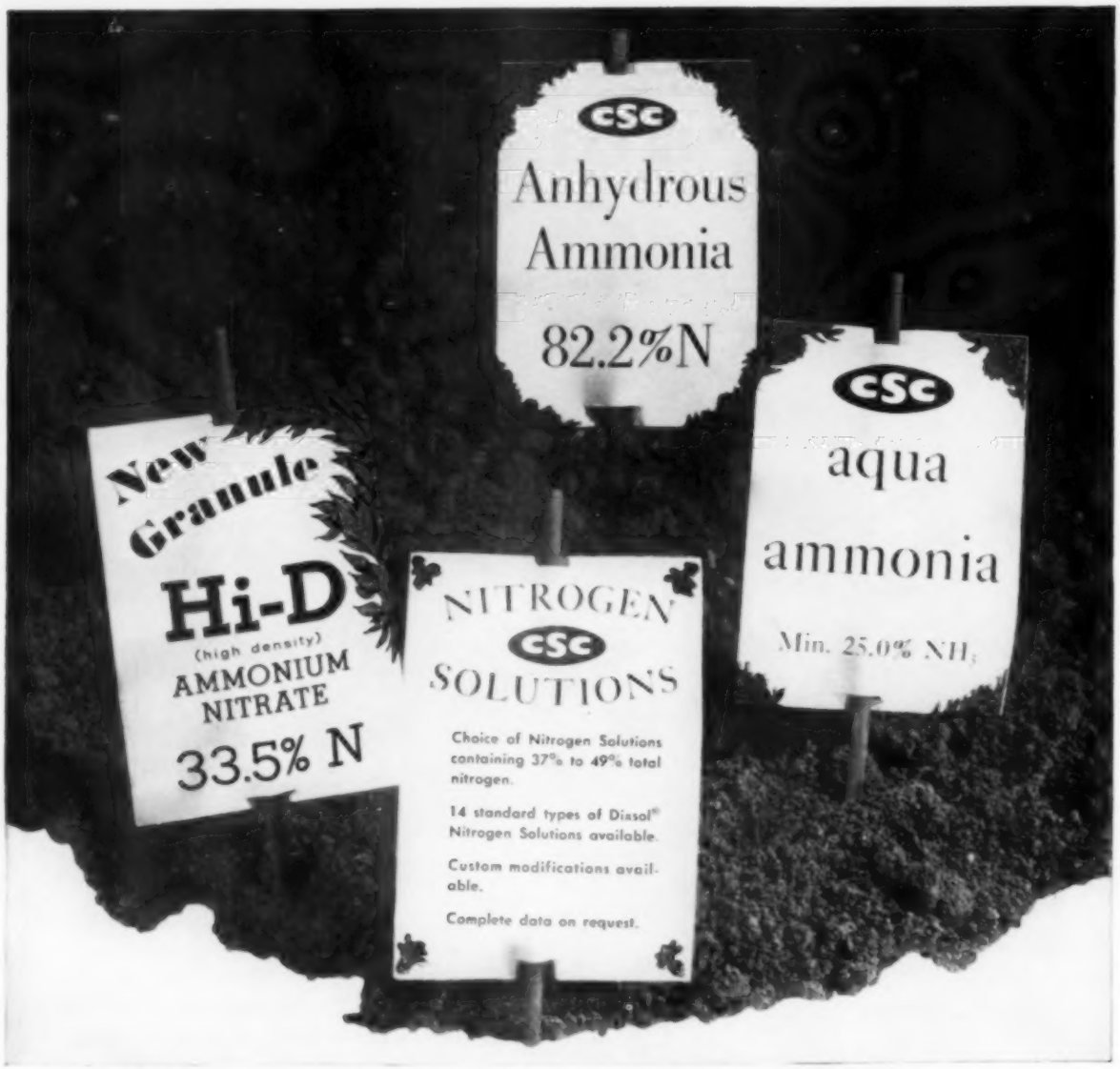
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Plant Breeding, Forecasting and Chemicals in Disease Control Discussed at APS 50th Meeting

OBSERVING its fiftieth anniversary, the American Phytopathological Society featured several discussions on the history of plant pathology, when it held its annual meeting on the campus of the University of Indiana, Bloomington, August 25-26. John A. Stevenson, USDA, opened a historical review of phytopathology with comments on the beginnings of plant disease control in the United States . . . the first course in plant pathology at the University of Illinois in 1873, and the organization of a Section of Mycology in the USDA in 1885.

Mr. Stevenson's remarks were complemented by a report on the development of plant breeding as a means of disease control, presented by J. C. Walker, University of Wisconsin, who observed that "our plant pathologists, in combination with geneticists, have developed plant breeding for disease resistance into an intricate science. Efforts of plant pathologists in 1956," he continued, "led to release of a new variety of wheat in the Pacific Northwest that was resistant to all of the known 25 races of the bunt disease fungus. Today, however, two new races of the bunt fungus have appeared, and pathologists' work must begin anew."

Chemicals in Disease Control

GEORGE L. McNEW, Boyce Thompson Institute, New York, reviewed the development of chemicals as a means of plant disease control. His report is summarized below:

"The adherence and persistence of fungicidal chemical sprays are a matter of physical structure—mainly spray particle size. To a greater and greater extent, the particle size of today's fungicidal sprays is being patterned to specific crops, weather conditions, and spray schedules.

"How the chemical works to protect plants from disease depends upon the design of the molecule. For example, solubility of chemicals is often the key to their effectiveness. Plant pathologists have designed fungicidal molecules that resist going into solution to the extent that they will be washed away by light rain, but that do go into solution readily enough to reach the disease organisms in a liquid state. These molecules are designed to resist the weathering effects of sunlight. Most important, they are designed to penetrate through the waxy covering and fibrous cell walls of fungus spores, and to interfere with the enzyme system—and thus the normal growth and development—of the disease organisms.

"From their knowledge of plant and disease chemistry, scientists have developed chemicals that will protect seeds from attack by the root and decay organisms in the soil. They have helped solve the problem of chemicals being toxic to both disease and plants by the development of a generative fungicide—a chemical that manufactures toxic material only as it is needed to combat attacking disease organisms.

"Most recently, they have begun to develop chemicals that will penetrate into and move through the plant to destroy disease organisms wherever they exist. These hold out the hope of controlling not only fungus diseases that attack the foliage of plants, but the fungi and nematodes that attack the roots, and the bacteria and viruses that attack the above-ground parts of plants.

"In the United States, farmers use about 15 million pounds of chemicals every year to protect the seeds they plant. They have found that as little as four cents worth of chemical returns more than $5 worth of extra corn; 70 cents invested in seed treatment increases pea yields by a fourth; 30 cents worth of chemicals boosts profits from an acre of spinach by as much as $50 to $300 dollars.

"American farmers use 25 million pounds of fungicidal foliage sprays a year. In fact, there is probably not a commercial producer of fruits or vegetables who does not rely on this chemical protection. An outstanding record has been made by one of the re-generative type fungicides in its use on potatoes. Since World War II, this fungicide, used in combination with the insecticide DDT, has increased the yield of potatoes by 90 percent. This compares with the less than 50 percent improvement in potato yields that took place in the previous 40 years.

"Plant pathologists believe that human want and suffering is the price paid for ignorance. Their increasing knowledge of plant diseases and chemical control offers the bright hope that one day soon men will be able to completely safeguard their agricultural production from diseases."

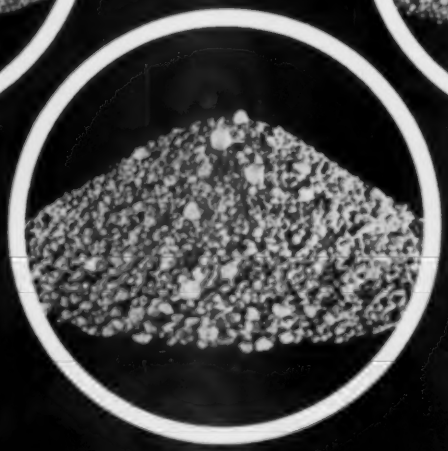
Future of Disease Control

IN the 50 years since their professional society was organized, plant pathologists have advanced their science to a point where plant diseases no longer threaten the extinction of cultures or civilizations as they once did. James G. Horsfall, Connecticut Agricultural Experiment Station, discussing the future of plant disease control in the United States, noted that "not too far ahead, plant pathologists see the day of chemotherapy . . . when chemicals can be used to cure sick plants. Already," he said, "research has shown that many of man's antibiotic wonder drugs are equally effective on plants." Plant pathologists look to their future job of eliminating plant diseases, he added with considerable optimism.

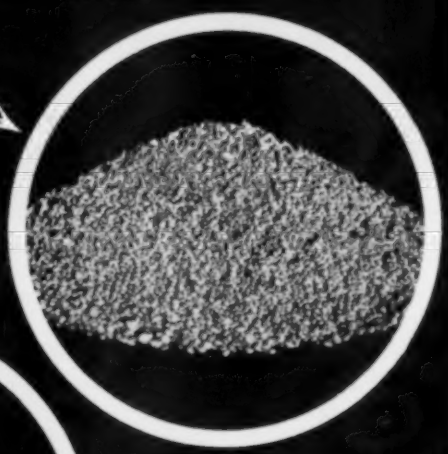
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On the future of chemotherapy—curing diseased plants with chemicals, S. H. Crowdy, who is associated with Imperial Chemical Industries, Ltd. of Berks, England, said that the most logical path for chemicals to follow when entering plants—through the roots—is practically ruled out by economic considerations.

As a result, chemotherapeutants are being and will continue to be applied to plant foliage. He said that it is not a normal function of plant leaves to take up chemicals from their surfaces. Further, he said, chemical sprays tend to dry out before much chemical can be absorbed. Nor does absorption guarantee diffusion. According to Dr. Crowdy diffusion is a problem of chemical translocatability—of finding chemicals with qualities that cause them to move (or be moved) through plants.

Dr. Crowdy, along with other chemists and plant pathologists, is working to answer these problems of chemical absorption and diffusion. He is seeking a basis other than trial-and-error methods of measuring the absorptive and translocatable properties of chemicals in relation to different species of plants.

Good progress has been made to improve leaf absorption of chemicals by adding wetting agents to increase the life of the spray film. The addition of glycerol to certain chemotherapeutants, for example, extends the time during which absorption can take place. In a typical case, about 20-30 per cent of a chemical applied to leaf surfaces was absorbed over a period of five hours. When glycerol was added, absorption extended over 24 hours, and about twice as much chemical was absorbed.

Other research has demonstrated that rate of uptake of chemicals by plants can be increased by the addition of plant growth regulating hormones, such as gibberellic acid.

Perhaps the bigger problem is chemical diffusion within plants, Dr. Crowdy said. So far, there are few scientific standards to guide the research worker. Some chemicals are diffused or translocated readily by one plant; not at all by another. For example, streptomycin is translocated by tomatoes, but not by broad beans. Sulfonamides are absorbed by leaves, but do not move within the leaf. Streptomycin moves from the base to the tip of the leaf. Still other chemicals, like the weed-killer, 2,4D, are translocated from leaves, through the plant, and out of the roots into the soil.

Disease Forecasting

PAUL MILLER, plant pathologist with the USDA, Beltsville, Md., reviewed the plant disease warning service which functions through close cooperative efforts of the USDA and the State Agricultural Experiment Stations and Extension Service. He said the service was started following the late blight epidemic of 1956, which practically wiped out the commercial tomato crop of the south . . . a $40 million loss. The service has grown as plant pathologists have been able to learn the causes of disease outbreaks.

As an example, Dr. Miller pointed out the research development of predicting bacterial wilt of sweet corn in Eastern United States. Scientists noted that disease outbreaks were influenced by temperatures registered the preceding winter. On the basis of the mildness of winter weather, pathologists are now able to predict the severity of the disease the following summer.

Weather is a critical factor in most plant disease forecasting, Dr. Miller reported. In predicting potato late blight in the Northeast, for example, research has shown that a definite combination of cool weather and rainfall is required to make this fungus dangerous. In the Middle West and South, the same disease is predicted on a basis of temperature and humidity (rather than rainfall). Over the past few years, plant pathologists have demonstrated that with ten days of such favorable weather, they can accurately predict a late blight outbreak within the next week or two. This gives growers enough time to dust or spray their vines with protective fungicidal chemicals.

Dr. Miller said that on the basis of information at hand, plant disease forecasting could be expanded a great deal in the United States. However, economic considerations rule out such rapid expansion. A warning service must pay its way, he said. It must deal with diseases that can cause serious agricultural losses, that can be controlled by growers, and that can be predicted in time for growers to employ remedial measures.

In Dr. Miller's opinion, plant disease forecasting will continue to grow as it has in the past—through research that increases man's knowledge of plant diseases and how they occur.★★

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Ga. Tour of Cotton Production

To demonstrate cotton production in Georgia, and particularly to answer the question, "Can the Georgia Cotton Farmer Compete with Other Farmers in the Cotton Belt?" the Georgia Agricultural Extension Service conducted tours September 4 and 5, inviting the agricultural trade press.

Included in the tour were visits to the J. C. Griffin Farm in Thomas County, the Bowen Farm and the Burton Farm in Dooly County. At these farms, cotton production practices recommended by the Extension Service were followed.

In 1957, Georgia averaged 333 pounds of lint cotton per acre. The 1958 demonstrations showed cotton yields 2 to 4 times higher than the state average yields, at a cost of approximately 18 to 20 cents per pound of cotton produced, offering undisputable evidence of what the Georgia cotton farmer can do when good production practices are followed.



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Arthur A. Glatz Dies

Arthur A. Glatz, for many years manager of the Chase Bag Company's Chicago sales office, died last month in Chicago. He had worked for Chase since 1921.

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Korean Fertilizer Tax

The Korean Minister of Agricultural Forestry, Jai Sul Chung, has asked that government-imported fertilizer should be exempted from foreign exchange tax. A special tax law was passed by the Korean House of Representatives last month that requires that traders who obtain aid funds and government dollar holdings will have to pay 150 hwan per dollar in foreign exchange tax.

Mr. Chung said that the tax will result in an aggravated burden for the farmer and will frustrate the government efforts to reduce the fertilizer price to help farmers.

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St. Regis Plant Tour

The St. Regis Paper Co., New York, conducted a special tour of its multiwall paper bag plant at Kansas City, Mo., Sept. 10, to exhibit its new pasted bag department.

The plant was opened in June, 1956, and had been equipped only to manufacture sewn multiwall bags. Now, however, pasted open mouth and valve bags as well as stepped-end multiwalls are manufactured there.

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Nitrogen Sales Down

Substantially reduced sales of nitrogen products in the fiscal year ended June 30 interrupted a 10-year growth pattern for the Spencer Chemical Co., Kansas City, Mo., the company's annual report disclosed last month.

One of the reasons advanced for the reduced nitrogen sales was the wet weather this spring which extended over much of the company's trade territory resulting in the deferment of some fertilizer applications and complete abandonment of others in some areas and on some crops.

ACS Discusses New Pesticides, Growth Regulators, Fertilizer Production, Food Laws, Pesticide Residues—at 134th Meeting

THE American Chemical Society at its 134th national meeting in Chicago, Sept. 7 to 12, found room on its vast program of more than 1540 papers for presentation of almost a score of reports dealing with fertilizer and production problems. These were discussed in sessions of the society's Fertilizer and Soil Chemistry division and the division of Agriculture and Food Chemistry.

The following abstracts—prepared by the ACS—describe some of the reports given at the meeting, of particular interest to pesticide and fertilizer manufacturers and researchers.

New Pesticides

MITOX, A NEW LOW TOXIC OVICIDE.

M. J. Diamond, G. K. Kohn, J. N. Ospenson, and D. E. Pack, California Spray-Chemical Corp, Richmond, Calif.

Mitox is a long-residual ovicide and larvicide initially developed by the Boots Pharmaceutical Co. of England, and introduced into American agriculture by the California Spray-Chemial Corp. Extensive research and development, as well as considerable commercial experience, have demonstrated that this is a highly effective material for the residual control of certain varieties of mites, particularly the European red mite and related species.

Chemically speaking, Mitox is p-chlorophenyl-p-chlorobenzyl sulfide. It exists, in the pure state, as a white, odorless, crystalline compound with a melting point of 72° C. Its residues are oxidized to the sulfoxide and the sulfone. It possesses high persistency. Extensive toxological tests indicate that the material has a very low degree of mammalian toxicity. Mitox is manufactured by the condensation of p-chlorothiophenol and p-chlorobenzyl-chloride in aqueous media. New methods of manufacture have been developed for each of the required intermediates and these processes have been critical to the successful development of this chemical. Mitox has found application on many crops, such as apples, pears, peaches, plumbs, tomatoes, eggplant, peppers, and ornamentals.

RESIDUES IN CROPS. FURTHER STUDIES WITH ISOPROPYL N-PHENYLCARBAMATE AND ISOPROPYL N-(3-CHLOROPHENYL) CARBAMATE. EFFECT OF HIGHER RATES OF APPLICATION.

Leavitt N. Gard, Carroll E. Ferguson, Jr., and James L. Reynolds, Columbia-Southern Chemical Corp., Barberton, Ohio.

The expanding experimental use of isopropyl N-(3-chlorophenyl) carbamate and isopropyl N-phenylcarbamate as selective herbicides in many new crops has created a need for residue studies on these crops. The crops receiving treatment with isopropyl N-(3-chlorophenyl) carbamate were rice, celery, peas, pea forage, lima beans, snap beans, soybeans, and soybean forage. Residue analyses for isopropyl N-phenylcarbamate were carried out on spinach, strawberries, and sugar beets (roots and foliage.)

Recently a governmental regulatory agency requested that residue analyses be carried out on crops receiving twice the recommended rate of treatment of isopropyl N-(3-chlorophenyl) carbamate. Crops analyzed after receiving these higher applications of isopropyl N-(3-chlorophenyl) carbamate were peas, pea forage, lima beans, snap beans, soybeans, and soybean forage. In no case with either herbicide was a residue found which exceeded 0.05 p.p.m., the lower limit of sensitivity of the analytical method.

THE NEMATOCIDAL ACTIVITY OF ALLYLIC AND ACETYLENIC HALIDES.

William Moje, University of California Citrus Experiment Station, Riverside, Calif.

Although little is known concerning the mode of action of nematocides, it has generally been assumed that the toxicity of organic halides is primarily a function of their physical properties, such as boiling point or vapor pressure, water solubility and wax solvency, or penetration. However, preliminary studies in this laboratory, using the citrus nematode *Tylenchulus semipenetrans* Cobb, indicated that the reactivity of organic halides was one of the most important factors determining their toxicity. This led to the development of special techniques for the estimation of the dosage response curves of several allylic and acetylenic halides in water using the larvae of this organism. The compounds tested were allyl chloride, propargyl chloride, 2,3-dichloro-1-propene, 3-chloro-2-methyl-1-propene, cis- and trans-1,3-dichloropropene, allyl bromide, and propargyl bromide. The relative toxicities of these compounds as measured by the concentration required to produce 50% inhibition of mobility, calculated by the probit method, was found to be related to their relative reactivities in the bimolecular nucleophilic-displacement reaction with potassium iodide in acetone.

The results of these studies are discussed in terms of some well-known theories in physical organic chemistry, and a possible mode of action by these halides is suggested.

EFFECTS OF SOIL PLACEMENT AND DOSAGE OF GIBBERELLINS ON PLANT RESPONSE.

M. A. Manzelli, Merck & Co., Inc., Rahway, N. J.

The use of granular products containing potassium gibberellate, at various per acre amounts and soil placement levels, has been shown to be effective in influencing the relative timing of plant growth responses. These responses include rapidity of germination, breaking of dwarfism, rate and magnitude of stem elongation, and wider spacing of internodes. In instances where bean plants are employed, the depth at which the granular potassium gibberellate is placed has direct relation to the numerical position of the internode first showing wider spacing.

Pesticide Residues

PROBLEMS THAT ARISE FROM PESTICIDE RESIDUES IN FOOD.

L. L. Ramsey, Food and Drug Administration, Washington, D. C.

The food processing industry should, in its day-to-day operations, be in a position to answer in the affirmative two basic questions with respect to pesticide residues:

1. Does the raw material being received for processing comply with the Federal Food, Drug, and Cosmetic Act either by bearing no residues or by bearing residues within the limits recognized by the legal tolerances?

2. Does the processed food product itself comply with the pesticide residue requirements of the law?

Means by which to assure that the raw material and the processed food meet pesticide residue tolerances are discussed: direct control exercised by the processor over pesticide usage, education of the grower in pesticide usage, analysis of the raw agricultural commodity and the processed food for pesticide residues, and a combination of these procedures.

Some indication of the magnitude of the problem confronting industry, as well as regulatory officials, can be obtained from the number and variety of pesticide chemicals now being used in production and preservation of raw agricultural commodities, the number of tolerances established, and the complexity of analytical considerations involved in testing for potential pesticide residues.

The ideal, as well as the most practicable, solution to the pesticide residue problem lies in the proper usage of pesticides. The Food and Drug Administration reiterates its recommendation of previous years that growers employ pesticides strictly in accord with directions on labels registered with the U. S.

Department of Agriculture: (1) on the crops specified, (2) in the amounts specified.

Growth Regulators

GROWTH-REGULATORY PROPERTIES OF FW-450, SODIUM α,β-DICHLOROISOBUTYRATE.

D. H. McRae and H. F. Wilson, Rohm & Haas Co., Bristol, Pa.

Investigations on the effect of chemicals on floral development demonstrated that sodium α,β-dichloroisobutyrate —experimental designation, FW-450— induced flower abscission of bean plants. Subsequent observations revealed that anthers of the abscissed bean flowers were without pollen. It was found in 1956 that sodium α,β-dichloroisobutyrate induced male sterility in flowers of several varieties of cotton without causing female sterility (F. M. Eaton, *Science* 126, 1174, 1957. These results stimulated further studies on the selective gametocidal effects of sodium α,β-dichloroisobutyrate on a number of crops such as cotton, corn, tomatoes, and cucurbits.

Field experiments on cotton plants treated with sodium α,β-dichloroisobutyrate produced male sterile flowers over an extended period of time. The duration of the male sterile response and the percentage of male sterile flowers obtained were dependent upon the application rate and the variety of cotton. The majority of male sterile flowers produced essentially normal bolls when fertilized with pollen from untreated plants. The selective gametocidal action of sodium α,β-dichloroisobutyrate and its application to the production of hybrid seed are discussed.

PRELIMINARY EVALUATIONS OF AMIDE, LACTIC ACID, AND TERPENOID DERIVATIVES OF SUBSTITUTED PHENOXYCARBOXYLIC ACIDS AS GROWTH REGULATORS.

C. F. Krewson, N. J. Saggese, J. Farquhar, J. S. Ard, and T. F. Drake (present address, Courtaulds, Inc., Mobile, Ala.), Eastern Regional Research Laboratory, Philadelphia 18, Pa., and J. W. Mitchell and B. C. Smale, Crops Research Division, U. S. Department of Agriculture, Beltsville, Md.

These investigations were undertaken for the purpose of utilizing materials of agricultural origin in the synthesis of conjugated biologically active compounds. Another objective was to obtain fundamental knowledge on the mode of action of growth regulators in plant metabolism and on the effects of modification of chemical structure on the biological activity of plant growth substances. Thirty-two new compounds were prepared—amides, terpenoids, and lactic acid derivatives, all of which induced plant growth responses. The derivatives of halogenated phenoxycarboxylic acids were obtained by coupling through the use of the Schottan-Baumann techniques; the lactic acid and terpenoid derivatives, by azeotropic dehydration or by pyridine-catalyzed esterification.

In general, the magnitude of plant growth responses was less than that induced by the parent regulating compounds. The data indicate that some derivatives may possess limited growth-regulating properties of interest, inducing a localized response. In a few cases the coupling of compounds with halogenated phenoxy acids resulted in the production of derivatives possessing increased growth-regulating properties.

In evaluating the compounds both monocotyledonous and dicotyledonous plants were used. Responses studied were stem curvature, growth inhibition, epinasty, formative effects, and induced cell proliferation.

General chemical reactions and tables representative of the plant growth-regulating responses obtained are illustrated by slides.

Sprout Inhibitors

DETERMINATION OF ISOPROPYL N-(3-CHLOROPHENYL) CARBAMATE RESIDUES IN POTATOES AND POTATO CHIPS TREATED FOR SPROUT INHIBITION.

Leavitt N. Gard, Columbia-Southern Chemical Corp., Barberton, Ohio.

Excellent results have been reported previously for the inhibition of sprouting in potatoes by treatment with isopropyl N-(3-chlorophenyl) carbamate. Since this chemical treatment is applied directly to the harvested potato, a knowledge of the herbicidal residue content was most desirable. Over a period of several years experimental samples of treated potatoes and also potato chips prepared from treated potatoes were obtained for residue analysis. Supplementing our analytical studies were independent analyses by the Wisconsin Alumni Research Foundation, which are included in this paper.

The basic analytical method of Gard and Rudd [*J. Agr. Food Chem.*, 1-630-2 (1953)] for determining micro quantities of isopropyl N-(3-chlorophenyl) carbamate in crops was applied in this study. The potatoes had been treated by either dipping or spraying with emulsions of isopropyl N-(3-chlorophenyl) carbamate containing from 0.5 to 2% of active ingredient. In all cases some residue was found in the potatoes, and soaking, peeling, or boiling in water did not reduce the residue to an acceptable level (0.05 p.p.m). However, when potato chips were prepared from the treated potatoes containing 0.075 p.p.m. of residue, the residue content of the chips was below 0.05 p.p.m., the limit of sensitivity of the analytical method.

FACTORS AFFECTING THE PERFORMANCE OF MALEIC HYDRAZIDE.

Allen E. Smith, John W. Zukel, Gracie M. Stone, and John A. Riddell, Naugatuck Chemical, Division of United States Rubber Co., Naugatuck, Conn.

The plant growth inhibitor 6-hydroxy-3(2H-)-pyridazinone, maleic hydrazide (MH), must be absorbed and translocated to be effective. Studies using tracer, spectrophotometric, and chromatographic techniques showed that maleic anhydride is stable, nonvolatile, and is translocated efficiently. Absorption, however, is often slow. Experimental techniques were developed to obtain quantitative data on the absorption of maleic anhydride by plants growing under controlled conditions. Plant species, plant condition, the maleic anhydride formulation used, and relative humidity during the absorption period were found to affect the absorption rate. Temperature, light intensity, and mode of chemical application were less important.

Conclusions based on the laboratory study were compared with the results of field tests. Several maleic anhydride formulations have been applied to root crops under varied, recorded environmental conditions. Both the degree of sprout inhibition and the analytically determined maleic anhydride residue in the root (or tuber) are consistent with the laboratory findings.

Thus, while field performance is the final test of any chemical or formulation, it may be more efficient to study first environmental and formulation factors under controlled laboratory conditions, using quantitative chemical and physical tests. The tentative conclusions drawn must then be confirmed by field performance tests.

Fertilizers—Production & Research

SOLUBILITY IN LIQUID MIXED FERTILIZER SYSTEMS.

A. V. Slack, J. D. Hatfield, H. B. Shaffer, Jr., and J. C. Driskell, Tennessee Valley Authority, Wilson Dam, Ala.

The solubility of combinations of fertilizer salts is an important consideration in the liquid mixed fertilizer industry. However, very few data are availabile on solubility relationships in the complex systems involved.

Three systems were studied: CC $(NH_2)_2$-NH_3-H_3PO_4-KCL-H_2O, NH_4NO_3-NH_3-H_3PO_4-KCL-H_2O, and [CO $(NH_2)_2$:NH_4NO_3 (fixed ratio)]-NH_3-H_3PO_4-KCL-H_2O. Fixed NH_3:H_3PO_4 mole ratios of 1.5, 1.6 and 1.7 were used. In the first system, studied in the temperature range of 0° to 25° C., the plant nutrient content of the saturated solution was found to be a linear function of the temperature when nutrient ratio and $NH_4H_2PO_4$ ratio were fixed. The last two systems were studied at 0° C.

Solubilities were measured only for selected nutrient ratios. However, graphic presentation of the data permits estimation of the solubility of other ratios at 0°C. and in the range of NH_3:H_3PO_4 mole ratios studied. Isotherms at other temperatures may also be constructed in the system containing urea. The $NH_4H_2PO_4$ mole ratio had the greatest effect on solubility at high phosphate ratios; the effect was rarely significant when the phosphate comprised less than half of the nutrients.

(*Continued on Page* 111)

Arcadian® News

Volume 3 | For Manufacturers of Mixed Fertilizers | Number 10

New Ammoniation Technique Yields—

UP TO 16% NITROGEN IN MIXED FERTILIZERS ALL FROM SOLUTIONS

For some time now Nitrogen Division, Allied Chemical, technical service men have been producing pilot plant quantities of high-quality, complete mixed fertilizers containing up to 16% nitrogen, with all the nitrogen derived from Nitrogen Solutions. These high-nitrogen grades can be economically produced in good physical condition.

The ammoniation technique involves the use of sulphuric acid with selected NITRANA® Nitrogen Solutions and no other nitrogen carrier. Certain modifications of standard ammoniating equipment are essential in this development, however as much standard apparatus as possible was used in the procedure. Operating techniques, with guides as to type of Solution, strength of acid, temperatures and other factors, have been worked out.

Based on these studies, several fertilizer manufacturers are planning to install equipment and preparing to use this new technique in their mixed fertilizer plants, with the advice and assistance of Nitrogen Division technical service men. They plan to produce such grades as: 14-7-7, 16-8-8, 14-0-14, 15-10-10, etc.

Development of this improvement represents another advance in the technique of manufacturing better fertilizers at lower cost. For information, contact Nitrogen Division, Allied Chemical, 40 Rector Street, New York 6, N. Y.

Arcadian News for Fertilizer Manufacturers . . . . . from NITROGEN DIVISION

16-8-8 Produces Big Yields in Wisconsin Pasture Tests



Spring top-dressing of Wisconsin pastures with 500 pounds of 16-8-8 per acre this year produced as much as 7,650 pounds increase in dry weight forage yield and 5.63% higher protein content than unfertilized pastures. These huge yield increases on pasture tests supervised by Extension Specialist C. J. Chapman led him to say: "It was the most amazing demonstration I have seen in 42 years of extension work."

College Recommends It

As a result, the University of Wisconsin is recommending that the fertilizer industry prepare to supply high-nitrogen 2-1-1 ratio fertilizers in the state next spring. Professor Chapman plans to set up many additional 16-8-8 pasture demonstrations in 1959, to show Wisconsin farmers this highly profitable way to improve pastures.

The highest forage yield on the six test farms using 16-8-8 in 1958 was 9,487 pounds dry weight per acre, compared to 1,837 pounds without fertilizer. With 16-8-8, the protein content of the forage tested 15.63% from a June 20 cutting. Samples taken earlier in the spring from pastures fed high-nitrogen mixed fertilizer have shown 20% or even higher protein content. Even at the figure of 15.63% protein, the farmer got the equivalent in pasture forage per acre of an extra 76% bags of 15 to 16% dairy feed.

Professor Chapman feels that "a 2-to-1 ratio of nitrogen to phosphoric acid and potash more nearly fits the requirements of pasture grass on our silt and clay loam soils than a 1-1-1 ratio."

Opens Steady Market

Years of pasture tests in Wisconsin have shown that 10-10-10 fertilizer produced big improvements in yield, protein, and early pasture turnout over no fertilizer or straight nitrogen. Now 16-8-8 or a 2-1-1 ratio promises even better yields and profits.

Some farmers have used 10-10-10 and straight nitrogen in alternate years, to get a similar effect. Under the new Wisconsin recommendation for 16-8-8 or a 2-1-1 ratio, fertilizer manufacturers will have a steady market for one analysis of fertilizer. Likewise farmers will have a steady supply of this ideal high-nitrogen pasture plant food combination. The 16-8-8 fertilizer is also excellent for lawns, golf courses and other tended turf markets.

Fertilizer Sales are Stymied by Poor Application Methods



Modern rolling disk attachment for planters. Gives precise control of starter fertilizer placement.

You might be surprised if you checked on how many fertilizer sales you're *not* making because farmers in your area do not have the proper application equipment! Unfortunately, this sales bottleneck exists in every section of the country. And it has been all too effective in preventing the mixed fertilizer industry from reaching its full sales potential. We see dramatic proof of this in the starter fertilizer picture.

Starter Fertilizer is Biggest Seller

It is generally conceded that mixed fertilizer is the best carrier of plant food for starter use. In fact, starter fertilizers—at recommended application rates—have demonstrated profitable response on *all* major crops—even where other fertilizer applications are heavy, and where soil

fertility is high. As a result, conservative estimates show that starter fertilizers make-up *more than two-thirds* of the total mixed fertilizer sold annually in the United States.

Has Even Bigger Potential

And yet, despite this large percentage of gross fertilizer sales, starter products have only scratched the surface! In this country, there are many areas of heavy crop concentration, particularly in the Midwest corn belt, where *less than 10%* of the planters and seeders are equipped with starter fertilizer attachments. Even in sections where fertilizer has been used the longest, much of the starter equipment is of an obsolete type not adapted to do a good job of placement with modern fertilizers.

Modern Equipment is the Answer

Today, most agronomists recommend placing starter fertilizer for corn two inches below and two or three inches to the side of the seed in single band applications. Old type split boot and shoe attachments cannot do this consistently. But it's no problem for the modern rolling disk attachment, introduced a few years ago. This device gives excellent control of placement, assuring better results under virtually all soil conditions.

Although college and trade groups have widely publicized this new starter fertilizer equipment, it is obvious that a major selling job still remains. Even in broadcast, top-dress and side-dress application a great proportion of the nation's farmers do not have the proper equipment for modern, mixed fertilizer. To repeat the point made earlier: mixed fertilizer has a *tremendous sales potential*—to be realized only when farmers have the proper application equipment!

Who Will Do the Job?

Naturally, the responsibility for getting modern equipment to the farmer lies principally with the equipment manufacturer. But since mixed fertilizer benefits so directly, it behooves the industry to work closely with equipment manufacturers and dealers in promoting the use of better application equipment.

How to Go About It

Right now you should be setting up a program for stimulating the sale of fertilizer equipment for use next spring. Make sure your salesmen are familiar with the types of fertilizer application equipment available to farmers in their territories. Urge your salesmen and dealers to work with implement dealers in promoting sales of suitable equipment.

If farmers will not purchase the necessary application equipment themselves, try to get dealers to make equipment available on a rental or loan basis. Or you might arrange to have properly equipped custom operators cooperate with your sales program. In areas where implement dealers are not active, you could encourage your dealers to take on a line of fertilizer application equipment as a service to their farmer customers.

Whatever you do to promote application equipment sales, you can be certain that it will be effort well spent. The pay off is direct: in more fertilizer sales for you . . . in customers more satisfied with your product!



Best Way to Win Customers: *Show Them Fertilizer Pays!*

The most effective way to *keep* a farmer sold on your fertilizer is to show him the actual profit figures on his own farm. It takes you only a few hours at harvest time, but it can be worth its weight in *extra sales* this winter and in early spring! For example, here is how you check corn yields—

All you need is a steel tape, a bag and a scale. Follow this simple procedure:

1. Measure two 1/100th acre plots in each area: one from a well-fertilized area, and one from a check strip.

1/100th acre equals:

2 rows 36 in. apart and 72.6 ft. long
or 2 rows 38 in. apart and 68.8 ft. long
or 2 rows 40 in. apart and 65.4 ft. long
or 2 rows 42 in. apart and 62.2 ft. long

2. Shuck every ear from each plot and weigh accurately. (3 pounds per check strip is approximately 5 bushels per acre.) If the two checks per acre vary more than 15%, an additional check or two should be made, and the results averaged. Also, the corn stalks should be counted and recorded for each check made. Thin stands often do not respond to heavy fertilization.

3. Take an accurate moisture sample and convert to 15½% moisture.

4. Figure yield according to this formula: Weight of sample (corrected for moisture) ÷ 70 x 100 = bushels per acre.

5. Compute yield difference and net profit from fertilizer.

You'll find it pays off in steady sales and *extra* sales to make these checks for *all* your new customers . . . and periodically for old customers. Start this fall!

HERE'S THE BIG LINE OF Arcadian® NITROGEN SOLUTIONS

When you purchase your nitrogen requirements from Nitrogen Division, Allied Chemical, you have many different nitrogen solutions from which to select those best suited to your ammoniation methods and equipment. You are served by America's leading producer of the most complete line of nitrogen products on the market. You get formulation assistance and technical help on manufacturing problems from the Nitrogen Division technical service staff. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions.

	CHEMICAL COMPOSITION %						PHYSICAL PROPERTIES		
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	26
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.188	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.052	48	-52
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
6	42.0	19.5	66.3	6.0	8.2	9.3	1.178	10	34
10	44.4	24.5	56.0	10.0	9.5	11.0	1.108	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.081	25	- 7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
15	44.0	28.0	40.0	15.0	17.0	12.7	1.052	29	1
U-A-S®									
A	45.4	36.8	—	32.5	30.7	16.2	0.925	57	16
B	45.3	30.6	—	43.1	26.3	13.5	0.972	48	46
Anhydrous Ammonia	82.2	99.9	—	—	—	24.3	0.618	211	—

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San Francisco 4, Cal., 235 Montgomery St. ..... Yukon 2-6840

INTERFERENCE BETWEEN NUTRIENT ELEMENTS IN PLANT GROWTH.

A. A. Nikitin, Tennessee Corp., College Park, Ga.

Iron, which plays an important role in the formation of chlorophyll, may be very readily oxidized by manganese. As a result of this oxidation, inactivation of iron takes place. To protect iron against further oxidation to the trivalent state, a high ratio between iron and maganese is essential.

The interference between iron and manganese commonly results in iron deficiency and severe manganese toxicity. The manganese toxicity in this case is a result not of a high initial concentration of manganese, but of the reduced ratio between iron and manganese

Iron, manganese, and copper represent a physiological unit and while manganese has antagonistic action, copper has synergistic action in the utilization of iron in chlorophyll synthesis. However, the real benefit of copper can be secured when it is used for foliar treatment.

Among other trace elements, magnesium should also be utilized to improve the performance of phosphate ion. Magnesium functions as a carrier of phosphorus, and also helps to reduce the precipitating action of phosphate ion on trace elements.

The anions of trace elements such as borate and molybdate have very powerful precipitating action on trace element cations due to their high alkalinity.

Zinc is essential for seed production in certain legumes and absorption of zinc is often reduced because of copper deficiency. Zinc is most important for fruit and nut trees because of its function in seed production.

COMMERCIAL ASPECTS OF CALCIUM METAPHOSPHATE HYDROLYSIS.

J. L. Jenista, A. V. Malone, and L. J. Pircon, Central Farmers Fertilizer Co., Chicago, Ill

Fertilizer grade calcium metaphosphate contains about 64% P_2O_5 and thus is an economic carrier of phosphorus. Preliminary work by James E. Seymour, at the Illinois Farm Supply Co., indicated that rapid hydrolysis and ammoniation of calcium metaphosphate could be attained by conducting the hydrolysis in the presence of a strong acid or base. This work led to the construction of a plant at East St. Louis, Ill., using a new process (Patent 2,837,418). This process tolerates a high degree of fluidity using a series of pug mills for hydrolyzing, ammoniating, and granulating the calcium metaphosphate mixture. Further investigation of the chemistry involved in this process showed that various degrees of temperature and acid concentrations of the initial reactants produced decidedly different end products, varying from complete hydrolysis to orthophosphate through pyrophosphates and chains of polyphosphates. The subsequent ammoniation rate of these products was also affected by the initial conditions. The use of sulfuric acid involved a high enthalpy change. Phosphoric and superposphoric acids produced lesser changes, while nitric acid produced little or no change.

At present the new hydrophos process is competitive with other existing processes, but continuing improvement in hydrolysis and ammoniation rates will produce a more economic, superior material.

HIGH-ANALYSIS SUPERPHOSPHATE BY THE REACTION OF PHOSPHATE ROCK WITH SUPERPHOSPHORIC ACID.

A. B. Phillips, R. D. Young, and F. G. Heil, and M. M. Norton, Tennessee Valley Authority, Wilson Dam, Ala

The production of high-analysis superphosphate (54 to 56% P_2O_5) by reaction of phosphate rock with superphosphoric acid was studied in bench-scale, pilot-plant, and plant-scale equipment. The best results were obtained when the acid concentration was about 74% P_2O_5 and when the acid was preheated in the range of 180° to 225°F. When the superphosphate was held in a den or storage pile, its temperature reached a maximum of 300° to 350°F. in about 40 minutes. This high temperature promoted fluorine volatilization and rapid conversion of the P_2O_5 to an available form.

The superphosphate usually contained 1% or less of free moisture, and the P_2O_5 was chiefly in the form of

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Hi-Flo GRAN-U-LATED is guaranteed 46% P_2O_5, minimum. It's ideal for dry mixing because it blends easily. And it's highly recommended for alkaline goods, especially 0-25-25.

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anhydrous monocalcium phosphate. About 65% of the fluorine was evolved as compared with about 15% in the production of conventional triple superphosphate. The comparatively anhydrous nature of the product and evaluation of compounds of fluorine account for the substantially higher P_2O_5 content.

Good ammoniating and processing characteristics have been demonstrated in pilot- plant and plant-scale production of granular fertilizers. Economies should be realized in handling and shipping the more concentrated superphosphate and in the higher grades of fertilizers that can be prepared with this material.

CALCULATION OF FORMULATIONS FOR GRANULAR FERTILIZERS.

John H. Payne, Jr., and R. T. Webber, Monsanto Chemical Co., St. Louis, Mo.

To assist the manufacturers of granular fertilizers with economic studies and improvement of plant operation, a formulation service has been put into operation. By use of an electronic computer, formulations for different grades can be rapidly calculated, using the customer's raw material specifications and operating conditions. For each grade, formulations can be calculated using different raw materials. Once the most economic raw materials have been established, a series of formulations is calculated in which heat and moisture and ammoniation level are varied systematically over the range of useful formulations. The final selection is based on actual plant tests.

COUNTERCURRENT VS CO-CURRENT DRYING OF GRANULATED MIXED FERTILIZERS.

N. K. Alfey and G. L. Bridger, W. R. Grace & Co., Washington Research Center, Clarksville, Md.

An experimental continuous mixed fertilizer granulation unit was operated with both countercurrent and co-current drying.

Comparisons were made of fume formation, chemical composition of product, and fuel consumption.

Countercurrent drying resulted in less fume formation in the dryer exhaust gases primarily because material adhering to the feed chute and flights, and the finer portion of dryer feed material were not subjected to as high throat temperatures as with co-current drying. Substantially lower fuel consumption resulted from countercurrent drying. No important differences in chemical composition of product were noted. To achieve less fume formation by countercurrent drying, proper design of the furnace and dryer is necessary.

GRANULATION OF BY-PRODUCT PHOSPHATE FROM SODIUM PHOSPHATE MANUFACTURE.

L. B. Hein and A. Long, Olin Mathieson Chemical Corp., Joliet, Ill.

Impurities in wet-process phosphoric acid are precipitated during neutralization of the acid with soda ash. The precipitate is separated from the sodium phosphate solution by filtration and dried to produce a plant food containing about 40% P_2O_5. Two dryers are used in series. Chains are used in the first dryer to prevent build-up by the entering material, which contains 60% water. The second dryer is of the roto-louvre type. A change in the control of moisture and retention time in the chain dryer greatly altered the physical character of the product. Prior to the change, a typical product was 50% minus 2, plus 6 mesh, and 50% minus 60 mesh. Since the change, 80 to 90% of the product is minus 6 mesh, plus 20 mesh, and the minus 60 mesh fraction is less than 3%. Also, hardness of the product was increased. Plant tests using the new granular product as a raw material in the manufacture of granular mixed fertilizers showed improved granulation for 1-4-X ratios similar to the experience previously reported with granular superphosphates and potash.

The granular product can be converted into a finely divided material by grinding. The powdered material is an excellent conditioning agent for both powdered and granular mixed fertilizers. The high P_2O_5 content of proven agronomic value permits use for conditioning without downgrading in most cases.

FUSED POTASSIUM PHOSPHATES.

J. M. Potts, W. C. Scott, and J. F. Anderson, Jr., Tennessee Valley Authority, Wilson Dam, Ala.

If the stability of your insecticide is important to you . . .

read these facts on carrier compatibility

Phosphate decomposition can usually be traced directly to the carrier. Unless the carrier is uniformly produced, has the proper pH, and has a low moisture content, you will *always* have trouble with product stability. And, as toxicant manufacturers know only too well, an unstable product does not build good customer relations.

That's why manufacturers turn to Pike's Peak Clay . . . a uniformly produced carrier in sizes from 325 mesh up to ½". Its exceptionally low moisture content and ideal pH of 5 far exceed the normal performance standards of other carriers. In addition, it is less hygroscopic and has free-and-easy flowability. But probably one of the most important benefits you get with Pike's Peak Clay is that this one carrier is equally as outstanding for *both organic phosphates and for hydrocarbons. Yes, . . . only one carrier to buy . . . one carrier to store . . . one carrier to use.*

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Huber Technical Service Bulletin IPD-4-2 reports fully on laboratory and plant trials; it discusses formulae, carriers, diluents and the wetting and dispersing action of surfactants on technical DDT. Send for your copy today.

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TABLE OF PROPERTIES

Composition	An ultrafine hydrated silica
Color	Bright white
Brightness (G.E.)	93-94
Refractive Index	1.51
Aver. Particle Diameter (microns)	0.02
Screen Residue (325 mesh)	0.5% max.
Oil Absorption (cc/100 grams)	155-165
pH (20%)	7.0-7.5
Specific Gravity	2.05
Form	Powder
Bulk Density—	
Aerated (lbs/cu ft)	3
Packed (lbs/ cu ft)	18-20



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Developers and Converters of Natural Resources . . . PLANTS AND OFFICES AT: Akron, Ohio; Appleton, Wisc.; Bayonne & Hillside, N. J.; Borger & Eldon, Tex.; Boston, Mass.; Buffalo & New York, N. Y.; Chicago, E. St. Louis & McCook, Ill.; Graniteville & Langley, S. C.; Havre de Grace, Md.; Huber, Ga.; Kalamazoo, Mich.; St. Louis, Mo.

Fused potassium phosphates in which the initial water solubility of the potash ranged from about 5 to 100% were prepared in small-scale tests. The compositions of the materials approached those of potassium metaphosphate and potassium calcium pyrophosphate. Materials that dissolve slowly in water over a period of several months were considered likely sources of slowly soluble potassium which would resist leaching and retard "luxury consumption" by crops. The more soluble materials may also have advantages because of their high analysis, low chlorine content, and low salt concentration in saturated solutions. The salt concentration in saturated solutions of experimental products, including completely soluble ones, was less than half that of potassium chloride, which is the most common potassium fertilizer. Small amounts of oxides of aluminum, iron, and silicon were effective in controlling the water solubility of potassium metaphosphate. The results of pilot-plant work in progress indicated that fused materials similar to the products from the small-scale studies could be produced in a "calcium metaphosphate-type" furnace from elemental phosphorus, potassium chloride, and phosphate ore. Typical grades of the potassium metaphosphate and potassium calcium pyrophosphate produced in the pilot plant were 0-55-31 and 0-42-25, respectively. Field tests are in progress to determine agronomic characteristics of the products.

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Airco Building At Denver

Air Reduction Sales Co., a division of Air Reduction Company, Inc., New York, has begun construction of an oxygen and nitrogen plant at Denver, Colo. This will be the company's first major gas-producing installation in the Colorado area.

•

Dow Fumigants Terminal

A new grain fumigants terminal of the Dow Chemical Co., Midland, Mich., began operations in Kansas City, last month. The new terminal includes blending, packaging, and warehousing for a complete range of space and liquid fumigants for the grain trade.

Facilities also include a complete testing laboratory. The terminal is being operated by the Inter-State Oil Co. for Dow.

•

Yale Franchise Reorganizes

The franchise representative in Virginia for industrial lift trucks and tractor shovels of the Yale Materials Handling Division, The Yale & Towne Manufacturing Co., Philadelphia, has been reorganized and expanded.

Formerly the S. L. Cooper Co., it is now the Richmond Materials Handling Corp., Richmond, Va. E. K. Rudisill is president of the new corporation.

•

Schrock Opens New Lab

Schrock Fertilizer Service announced the opening of Consolidated Laboratories, Congerville, Ill., on September 10th.

Largest Nitrogen Shipment

What is believed to be the largest shipment of nitrogen solutions for agriculture this year, requiring a 40-tank car train and eleven tank trucks, was dispatched from the Sohio Chemical Co. plant in Lima, Ohio, last month, to the plants of the Aylco Liquid Fertilizer Co., Sullivan Ill., and its dealers.

More than 400,000 gallons of nitrogen solutions were included in the shipment.



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PACKAGING SPECIALIST
GENE CARTLEDGE

helps Multiwall user reduce bag costs $4.05 per M

In Multiwall packaging, paradoxically, it's sometimes necessary to add in order to reduce. Take the case of one leading company whose bag designs recently were analyzed by Union Packaging Specialist Gene Cartledge.

The firm uses Sewn Open Mouth Multiwalls in part of its operation. Cartledge recommended adding Union's special SEW STRONG construction (reinforcing strips at top and bottom of bag). The stronger closure enabled the basis weight of each bag to be reduced by 10#. The new sewing method led to a reduction in bag length, an improved bag design—and $4.05 per M savings! Another recommendation: convert all the firm's present Sewn Valve Multiwalls to Sewn Open Mouth types. This complete changeover will further streamline bagging and, based on the company's annual requirements, result in thousands of dollars in additional savings.

Union Multiwall Recommendations are based on this 5-Star Packaging Efficiency Plan



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- EQUIPMENT
- CONSTRUCTION
- SPECIFICATION CONTROL
- PLANT SURVEY

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Better Multiwall performance through better planning

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UNION'S PACKAGE ENGINEERING DEPARTMENT will study your Multiwall bagging methods and equipment and make appropriate recommendations, regardless of the brand of Multiwalls you are now using.

UNION MULTIWALL BAGS

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Equipment, Supplies, Bulletins

Single-Gusset Multiwall



A new concept in bag construction, a single-gusset, sewn-valve multiwall bag, has been introduced by the Bemis Bro. Bag Co., St. Louis, Mo. The new design is said to create additional usable space, more room for product flow during filling operations, and reduction of blowouts.

The extra space created by the flat tube side often permits utilization of a shorter bag, according to Bemis.

•

Penco Dessicant Folder

A folder describing the desiccation of alfalfa with Endothal Harvest Aid has been prepared by the Pennsalt of Washington Division of Pennsalt Chemicals Corp., Tacoma, Wash.

The folder lists advantages of the product and covers both air and ground application methods. Penco Endothal Harvest Aid is a liquid formulation which mixes with water for application.

•

Munson Offers Attrition Mills

A new line of ball bearing attrition mills is now being offered by Munson Mill Machinery Co., Utica, N.Y.

The prime use of attrition mills is reduction of grains and grinding of industrial materials, such as fertilizers. Their versatility is limited only by the size of the initial material, and the product can be ground fine enough to pass through a 250 mesh screen.

Chlorate Safety Chart

A large safety wall chart listing instructions for the proper handling of chlorate and perchlorate chemicals has been prepared by the American Potash & Chemical Corp., Los Angeles.

The chart is a digest of safety rules and conduct and a first aid section contains instructions in case of accident. The chart may be obtained from the company at 3000 West Sixth St., Los Angeles 54.

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You need little or no stabilizer when formulating dusts with the newer pesticides when you use PYRAX ABB as the diluent.

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When you dilute any toxicant with PYRAX ABB, you reduce costs due to easier handling, better coverage, and simpler formulation.

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YALE outperforms any loader—handles 25% more material every hour...Field tests prove it!

EXTRA WORK PER HOUR. No matter what bulk you handle, you'll get more productive work at less cost with the new Yale Industrial Tractor Shovel. *It carries more*—full 2500-lb. bucket capacity. *It moves faster*—accelerates to operating speed of 8 mph in 3.5 seconds—to 13 mph in 5.5 seconds. Exclusive Yale Torque Transmission (fully automatic) permits quicker, smoother starting, eliminates shifting, provides more power under load conditions—speeds cycle operations. Gasoline or LP-Gas.

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EXTRA LOADING AND DUMPING FEATURES. Yale's exclusive 45° ground-level tipback insures the ultimate in loading action—and a grade-level carrying position to minimize spillage. Exclusive 6' dumping clearance is the highest on any model of similar wheelbase. Bucket is automatically self-locating—lowers from full dump-position to ground-level. Bucket automatically returns to digging position.

For a demonstration in your plant or for actual case histories, write to The Yale & Towne Manufacturing Co., Philadelphia, Pa., Dept. 10610

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For only 3¢ more per hour* the Yale Industrial Tractor Shovel offers these exclusive features

- Exclusive Yale Torque Transmission (fully automatic)
- Exclusive 45° ground-level bucket tipback
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*Based on comparative initial costs depreciated over 10,000 working hours.

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YALE MATERIALS HANDLING DIVISION, THE YALE & TOWNE MANUFACTURING CO. MANUFACTURING PLANTS: PHILADELPHIA, PA.; SAN LEANDRO, CALIF.; FORREST CITY, ARK.

Metal-On Pipe Insulation

Johns-Manville, New York, has prepared a booklet describing its Metal-On Pipe Insulation, a new development which provides thermobestos calcium silicate pipe insulation and an aluminum jacket in a single package.

The new J-M product is expected to reduce both installation time and costs. The insulation is especially designed for temperatures up to 1200 F. Complete information is contained in booklet IN-217A, available from the company at 22 East 40th Street, New York 16.

•

Oliver Rotary Filter Booklet

Dorr-Oliver, Inc., Stamford, Conn., is making available a 24-page bulletin that describes the designs of the firm's five principal types of rotary drum units.

The booklet lists component parts and details conventional accessories, auxiliaries, and construction materials. Bulletin No. 7200 also includes some fifty photographs and line and wash drawings of various filters and components as well as tables of sizes and capacities of each design.

•

Yale Modifies G-3 Truck

The Yale Materials Handling Division of the Yale & Towne Manufacturing Co., Philadelphia, has modified its 20,000 pound capacity G-3 truck by developing a 48-inch load center that gives the truck the ability to transport and stack loads that extend eight feet out from the face of the fork carriage.

The additional capacity on the G-3 has been achieved by lengthening the frame and wheel base and adjusting the counterweight. The trucks previously had a 24-inch load center.

•

Dutch Elm Disease Folder

"Facts About Dutch Elm Disease", is the title of a folder issued by John Bean Div., FMC, Lansing, Michigan, and containing literature and bulletins on treating for control of this disease. Some of the bulletins concern equipment manufactured by John Bean for spraying orchards, grain, brush, etc. The literature reports on methods and results in control measures against Dutch Elm Disease in Detroit, Mich., Greenwich, Conn., Ann Arbor, Mich., and other eastern and central states. Photographs showing disease damage, spread of the disease, etc., are also included in the folder, which is available from Dept. AC, John Bean Div., FMC, Lansing, Michigan.

Automatic Bulk Scale

A completely mechanical bulk weighing scale developed by the Richardson Scale Co., Clifton, N.J., will weigh and record dry, granular, sluggish, powdered, and dusty materials.

Designated model MSM, it is a gravity-flow mechanical system. Capacities are from 20 to 50 pounds, with volumes up to five cubic feet. Complete information is available from the company at Van Houten Ave., Clifton.



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The Air-Gravity Conveyor
with the Smooth, Durable,
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The superiority of the exclusive KENNEDY porous tile design over other conveying surfaces has been conclusively demonstrated by many years of full scale operation. The smooth surface has no dead spots and no roughness to impede flow. The tile cannot sag and maintains its properties even at elevated temperatures. Years of operation with Air-Float have required no replacement of conveyor parts due to wear or deterioration.

Air-Float thus offers definite advantages over other horizontal conveying methods:

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- Operates quietly—has high capacity—requires little headroom
- The conveyed materials are completely enclosed—there is no dust
- Permits flexible design—directional changes are simple
- Can be made from corrosion resistant alloys
- Eliminates lubrication, complicated gears, belts and chains, spare parts and down time for maintenance

Send for literature describing KENNEDY Pneumatic Conveying Pumps, Air Activated Containers, Air Float Conveyors, complete Pneumatic Conveying installations, and KENNEDY Research and Testing Services.

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Frontier Redesigns Bag



Frontier Chemical Co., Wichita, Kans., a division of Vulcan Materials Co., Birmingham, Ala., is offering its Frontier brand benzene hexachloride in a newly-designed multiwall bag.

•

Antara Surfactants Booklet

The Antara Chemicals Sales Division of General Aniline & Film Corp., New York, has published a 16-page booklet on the properties and uses of the company's Igepon series of anionic surfactants.

The brochure describes the chemical derivation of Igepon and gives the chemical formula, functional properties and uses of each of the brands. It is available from the company at 435 Hudson St., New York 14.

•

Low-A-Trol Batching Scale

The Thayer Scale Corp., Pembroke, Mass., has developed a new "Low-A-Trol" constant-feed batching scale. The new scale utilizes an electronic closed circuit that is said to provide for final accuracies of 0.1 per cent.

The control system has no mechanical parts subject to wear.

•

Florida Field Trials

Dr. G. R. Townsend has prepared a folder listing prices for his evaluations of agricultural chemicals for the chemical industry. Dr. Townsend conducts tests on foliar fungicides, soil fungicides, seed treatments, insecticides, nematocides, herbicides, and fertilizers. The booklet is available from Dr. Townsend at Box 356, Belle Glade, Fla.

•

Second Hanna's Handbook

The second edition of *Hanna's Handbook of Agricultural Chemicals* is scheduled to be published this month. Copies will be available from Lester W. Hanna at Rt. 1, Box 210, Forest Grove, Oregon.

Pressure Relief Valve

The Spraying Systems Co., Bellwood, Ill., is offering a pressure relief valve in which the valve guide and inlet adapter are fitted with hardened stainless steel inserts to provide a high degree of resistance to abrasive wear. The balance of the unit is made of brass with stainless steel springs.

Complete information on the new valve is available, in data sheet 7840, from the company at 3230 Randolph St., Bellwood.

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These men are saving Phillips mixer customers thousands of dollars. By employing the "brains" of the electronic computer formulating machine, they help fertilizer mixers arrive at more effective and lower cost formulations.

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Free services are available to you . . . from our new Phillips *66* Pilot Plant, to help you cut formulation costs and improve the quality of your products.

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● For your high quality fertilizers, look to Phillips for a dependable source of supply . . .
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NEW YORK, N. Y.—*80 Broadway*
OMAHA, NEB.—*3212 Dodge Street*
PASADENA, CALIF.—*317 North Lake Ave.*
RALEIGH, N. C.—*401 Oberlin Road*
SALT LAKE CITY, UTAH—*68 South Main*
SPOKANE, WASH.—*521 East Sprague*
ST. LOUIS, MO.—*4251 Lindell Blvd.*
TAMPA, FLA.—*3737 Neptune St.*
TULSA, OKLA.—*1708 Utica Square*
WICHITA, KAN.—*501 KFH Building*

CACA MEETING

(*From Page 47*)

ments are also very encouraging.

Mr. Sackston cautioned, however, that although discovery of new chemicals to control diseases, insects, and weeds in major crops is extremely important, the chemicals must be used carefully and according to manufacturer's recommendations. When the "balance of nature" is upset, brand new problems may appear as the direct result of the control measures used.

"The daily forecasts of weather, while very accurate, are only of very limited use to agriculturists," advised B. W. Currie, University of Saskatchewan, in a discussion of "Weather Forecasting and its Application to Agriculture." A farmer needs information to plan operations for the next two or three weeks period, and 15 to 39 day forecasts referring to expected differences from the average temperatures and precipitations are important, even though they are mostly qualitative in nature. Notable advances have been made in providing these forecasts, he advised, and improvements may be expected in the next few years . . . especially if artificial satellites can be used to collect weather data from large areas of the earth's surface not presently served by weather stations.

A final report at the 3-day meeting, presented by G. H. Neilsen, Canadian Petroleum Association, dealt with the "Petro-Chemicals Industry in Western Canada, and its Relationship to Agricultural Chemicals."

HIGH CLEARANCE RIGS

(*From Page 57*)

problem was solved by one of the engineers at Stoneville, who devised a special heat-exchanger type vaporizer that has proved practical and economical to operate.

Although experimental attachments have been devised for applying chemicals for late-season weed control and for defoliants, additional research is needed to perfect application equipment of this kind.

One of the most outstanding qualities of the high-clearance applicator is its low cost of operation. Results of a survey of high-clearance machine operators, in April 1956 by Mr. James H. White of the Arkansas Department of Rural Economics, indicated the cost of application with the ground machines was much less than with airplanes, when a total of 1000 acres or more acreage was covered per year. The study, which did not include the cost of the spray or dust, showed that the cost of application was less than one-half that for airplanes when the total acreage involved was more than 3000 acres.

It also has been determined in tests conducted by insecticide manufacturers that farmers can maintain a 3-day schedule with ground machines at the same cost as that required for maintaining a

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Offering:

INSECTICIDE GRADE PYROPHYLLITE

- ph 6 to 7
- 30 lbs. per cu. ft.
- avg. particle size below 5 microns
- non-alkaline
- chemically inert
- 92-95% passes a 325 mesh screen
- non-hygroscopic

Insecticide Grade Pyrophyllite is the ideal diluent and conditioner for all types of insecticidal dusts. As it is non-hygroscopic, dusts compounded with Insecticide Grade Pyrophyllite will not absorb moisture. Nor is there any tendency even during extended storage, for the carrier to separate from the active ingredients.

Insecticide Grade Pyrophyllite has superior adhering properties, and because it is difficult to wet, it holds well on the plant leaves even during rain. When used as a carrier for products to be dusted by airplane, it settles rapidly minimizing drift, waste of materials, etc.

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With the addition of a phosphatic solution plant to its chemical complex at Tuscola, Illinois, U.S.I. can now supply a large area in the Midwest with a variety of fertilizer materials that will meet all your needs for these components:

PHOSPHORUS . . . in the form of Phosphatic Fertilizer Solution (wet process phosphoric acid, 54-55% P_2O_5). This is available from U.S.I.'s new plant which produces 30,000 tons/year of P_2O_5. This chemical frequently enables you to make your regular and special granular grades of fertilizer at lower cost . . . and to make higher analysis grades.

NITROGEN . . . available as anhydrous or aqua ammonia, plus 16 types of nitrogen solutions including urea types.

SULFURIC ACID . . . available in all concentrations including oleum, plus good spent acid of fertilizer quality. Plants, not only in Tuscola, but also in Sunflower, Kansas, and Dubuque, Iowa.

To help you make the most of these various products, U.S.I. Technical Service people are ready to work with you. The U.S.I. Engineer will help you trouble shoot, set up formulations, work with you on experimental runs, consult with you on equipment selection, and can also offer U.S.I.'s laboratory facilities for more intensive investigations.

For products or assistance from U.S.I. Technical Service Department, write Heavy Chemicals Sales.

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Division of National Distillers and Chemical Corp.
99 Park Ave., New York 16, N. Y.
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5-day schedule with airplanes. This includes the cost of materials which are available currently. Even greater savings can be expected when farmers fully utilize their machines for the many different operations that can now be done.

Other important advantages of the self-propelled, high-clearance applicator over airplanes include: (1) better control of the quantity of chemical applied, (2) placement of the chemicals exactly where they are needed, (3) covering parts of fields that are inaccessible to airplanes, and (4) competition for aerial applicators, thereby generally assuring a better job when aerial application is used.

The primary disadvantage of the high-clearance ground applicator is the problem of operating in wet fields. This is caused by excessive rainfall in some areas and by irrigation in others. Due to the light weight of this applicator, presently available row-crop tires at minimum pressures do not provide adequate flotation. Investigations were recently initiated by public research engineers in cooperation with tire and machinery companies for the purpose of studying this problem. Controlled laboratory and field tests on tire flotation and mud shedding qualities have been designed to provide basic information that can be used in improving the overall performance of self-propelled, high-clearance machines.

Although many other weaknesses have been corrected, the following areas appear to need additional attention:

1. Adequate power units on all models (minimum of about 25 horsepower).
2. Lower center of gravity for improved stability on tricycle models.
3. Increased use, if possible, of the 2-drive-wheel principle.
4. Less weight and increased strength in chassis.
5. Floating type wheel shields.
6. Easier operation of vehicle and applicator.
7. Speedometer.
8. Corrosive-resistant plumbing fixtures and tanks.
9. Safer loading and operating facilities.★★

NEW PESTICIDES

(*From Page 34*)

which had been well established commercially, continued their steady progress in performance and acceptance. Certain other Bayer products found new commercial applications in 1958, and at least one entirely new product, Co-Ral, was registered and distributed in commercial trade channels for the first time this year.

Guthion, which had previously been introduced for cotton, was sold commercially in the deciduous fruit areas for the first time. Its acceptance and performance were most gratifying. We also were pleased with the acceptance of Co-Ral, a new livestock insecticide which effectively kills cattle grub within the animal before they can

AGREM
EMULSIFIERS
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All purpose single emulsifiers: AGREM 500, AGREM 600. Either of these emulsifiers can be used to give flash dispersion and excellent stability to formulations containing chlorinated hydrocarbon toxicants in a wide variety of solvents.

Specific phosphate insecticide emulsifiers: AGREM MP and M, AGREM P, AGREM Q. These emulsifiers are specifically suited to the formulation of Malathion, Parathion and Methyl Parathion.

All purpose twin emulsifiers: AGREM 102 and AGREM 103, AGREM 217 and AGREM 221. These emulsifiers, when blended properly, can be used to produce excellent concentrates containing the chlorinated pesticides and all herbicide esters.

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THE FLUID ENERGY

JET-O-MIZER

The modern mill for processing heat sensitive organic toxicants

Pesticides and fungicides in concentrates and field strength wettable powders and dusts, using BHC, Chlorodane, DDT, Dieldrin, Endrine, Heptachlor, Toxaphene and similar organic toxicants, can now be prepared with ease, using the Fluid Energy "Jet-o-mizer."

This heatless, motionless mill processes these low melting point, heat sensitive materials with a minimum of mill build-up. There are no moving parts to generate heat, no screens to plug.

Formulation is simplified too. Inerts do not compact . . . there is no lowering of oil absorption value. Consequently, less high priced carrier is needed . . . more lower cost extender can be used.

And there are other values to Fluid Energy processing of these important agricultural chemicals:

- The "Jet-o-mizer" grinds "coarse" . . . for specifications calling for 325 mesh products. Or they grind fine . . . as low as ¼ micron average, or to satisfy WHO and ICA requirements.
- The "Jet-o-mizer" is versatile . . . it handles a wide range of raw materials and products well . . . it is ideally adapted to off-season grinding of inerts and other materials.
- The "Jet-o-mizer" operates continuously . . . guaranteeing the maximum of product uniformity and throughput.
- The "Jet-o-mizer" efficiency at the fine grind end of the spectrum improves residual toxicity of most pesticides.
- The "Jet-o-mizer" combines many operations . . . wet clays can be dried, ground, blended with toxicants and classified . . . all in one operation.
- The "Jet-o-mizer's" superior blending and grinding reduces the need for costly preparatory equipment.
- The "Jet-o-mizer's" perfect partner for high product recovery is the patented "Jet-o-clone" . . . designed specifically for fine particle collection.

Investigate our facilities for product testing and custom grinding.

Investigate the *extra profit* possible with "Jet-o-mizing!"

The "Jet-o-mizer" uses air as the elastic grinding fluid . . . there are no moving parts . . . no heat from grinding . . . low maintenance.

Send for our new bulletin describing "Jet-o-mizers" and "Jet-o-clones."

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Richmond & Norris Sts., Philadelphia 25, Pa.
(Formerly known as the Wheeler-Stephanoff Mill)



A typical Fluid Energy Mill installation, in continuous operation for more than ten years.

damage meat or hide. It has also proven to be extremely effective in control of screwworms, hornflies, lice and ticks.

Systox, the pioneer systemic insecticide, continues to be one of our strongest products, and because of the good performance of products such as Systox, Guthion and Co-Ral, prices have been firm, with little or no resistance from the consumer.

1958 was also helpful to us in the further market testing of other new products from the Bayer complex, and as we complete more and more of the facilities of our new plant at Kansas City, we become quite optimistic so far as 1959 and the future years are concerned.

We see many new and unique chemicals being introduced by a considerable number of companies, which indicates that extensive research is being conducted in the agricultural chemical field. This, we believe, augurs well for our industry and we are most happy to be a part of it.★★

AG CHEMICAL SERVICE VIEW

(*From Page* 33)

Since our business is primarily cotton, we had expected our volume to be off proportionately to the 52% of our acreage which went into the Soil Bank. However, in spite of the fact the weevil infestation was low, there were more other pests than we have had in a number of years. Because of this, and the rankness of the plants, the rates of application were much higher, resulting in overall volume being very nearly what it was last year. With the exception of blenders and formulators with large carry-overs from 1957, and a few other businesses disposing of stocks at cost or below, the market was generally better than we expected under the circumstances. The basic producers have held a pretty firm hand during 1958, and this has contributed materially to a more stable market.

1958 was much kinder than we expected, and because we find growers have an open mind to new products and are willing to pay reasonable prices for quality materials, we cannot help but look forward to 1959 with anticipation; confident of one of the better years for agricultural pesticides.★★

COTTON MARKET OFF

(*From Page* 32)

30% dollar-wise. This has been due largely to the wide acceptance of PELCO MH-30 and PELCO granular insecticides for soil treatment under tobacco, corn, potatoes, and peanuts. Prices have been generally in line with prices a year ago, sofar as most pesticides are concerned. Two or three chemicals seem to have weakened in price this year sofar as the dealer and consumer level is concerned.

All phases of production, selling, delivering, and servicing pesticide accounts have steadily gone up, which must come out of profits, and in our opinion profit levels have been too low to absorb the extra cost of producing. Our company will make an overall reasonable profit for our fiscal year which ends October 31st, but this has been made possible by increasing sales which means if the demand for our products should go down, the same percentage would leave us with very little or no profit.★★

RECORD GRASSHOPPERS

(*From Page* 32)

market, our new short residual Phosdrin® insecticide has been well received where difficult insect control problems existed, and where infestations occurred close to harvest.

To summarize, we can say that 1958 presented many unique marketing problems; but it was a favorable year for sales.★★

NIAGARA VIEW OF SALES

(*From Page* 31)

Weather

Weather conditions for farm crops have been almost ideal in 1958. The good growing season was favorable for herbicide usage. The

it's... magnesia for greater yields

Year after year Berkshire's EMJEO® (80-82% Magnesium Sulphate) and Calcined Brucite (fertilizer grade) 65% MgO have proved to be invaluable primary plant foods—together with nitrogen, phosphorous, and potash.

it's... BERKSHIRE for highest quality magnesia

Be sure to include Berkshire's EMJEO and/or Calcined Brucite (fertilizer grade) in your mixtures as sources of available magnesium. You'll be glad you did.

and

it's... BERKSHIRE'S POTNIT*

(94/95% Nitrate of Potash) for special mixtures and soluble fertilizers.

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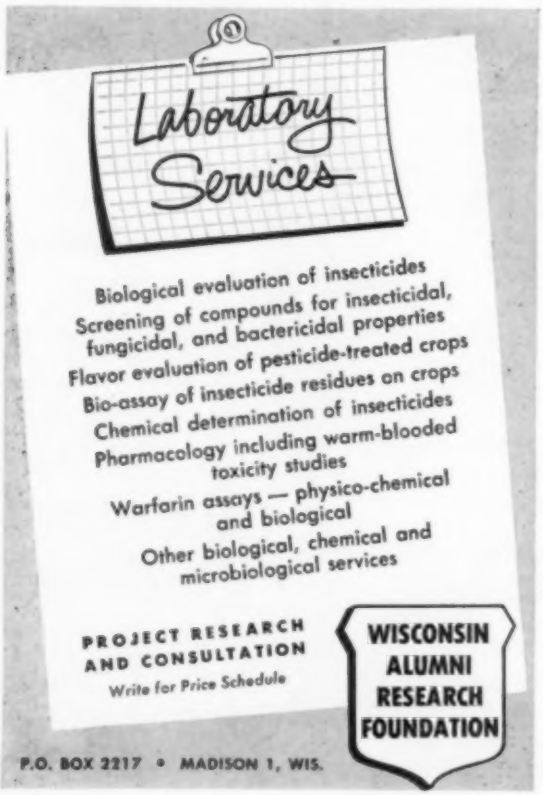
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AVAILABLE in COMMERCIAL QUANTITIES DDVP

DIMETHYL DICHLORO VINYL PHOSPHATE, minimum 95% purity, is now being used in sugar-based fly baits and as an effective insecticide against the phorid fly in mushroom culture. Because of its high insect toxicity in very low concentrations, and its relatively low toxicity to warm-blooded animals and lack of residue, experimental work is suggested in many fields of application.

DDVP is now being supplied in commercial quantities for authorized uses and in experimental quantities to qualified experimenters.

AVAILABLE in COMMERCIAL QUANTITIES DET

DIETHYL TOLUAMIDE, the "most" successful wide-spectrum insect repellent developed by the U.S.D.A. and Army Quartermaster Corps.

Montrose DET is guaranteed to contain 95% minimum meta isomer, the most effective isomer as shown by field tests. DET aerosol, lotion and spray formulations were successfully marketed in 1957. Montrose DET is available for prompt shipment from stock.

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104-112 Lister Avenue Newark 5, New Jersey

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10 Rockefeller Plaza, New York 20, N. Y.
1721 Tribune Tower, Chicago 11, Illinois

only major unfavorable effects of weather that come to mind are the freeze damage to citrus and vegetable crops in Florida, excessive rainfall adversely affecting the Mississippi-Delta cotton crop, and a reduction in soil fumigation in the Carolinas due to excessive rainfall.

Prices

Prices were steady at the low levels that have prevailed for the past several years. Inventory liquidation by a few producers and severe competition for the limited acreage cotton business had the expected depressing effect on prices of certain commodities.

New Products

No new wide-spectrum pesticide chemicals had any impact on the national product line. There are, however, many new special-purpose materials with limited market potentials being introduced successfully. These special-purpose products are probably enlarging the total market and may perhaps be capturing a portion of the existing market. The agricultural pesticide consumers, while extremely cost conscious, will pay higher prices for more efficient materials. The frequency of introduction of new materials seems to be removing some of the old reluctance to substitute new things for old.★★

DISTRIBUTION SYSTEM

(*From Page* 31)

The distribution of agricultural chemicals, be they commercial, or home and garden products, is dependent on the flow of the product from the manufacturer through the distributor, through the retail point and then to the consumer. If the basic manufacturer of any agricultural chemical has established prices, I believe all recognized distributors should follow that pricing schedule. We handle many different agricultural chemicals. I know, where we have the cooperation of the basic manufacturer in publishing price schedules, that we have very little trouble on the price structure of the consumer product. The future distribution of all agricultural chemicals is dependent on the cooperation among all the parties involved. I hope within the very near future, that we see a trend where all manufacturers, distributors, formulators and dealers, cooperate in the price structure and distribution of agricultural chemicals. Let all of us closely connected with the agricultural chemical industry, try to preserve the vital Distribution System.★★

GLF VIEW OF '58

(*From Page* 30)

dications of being a widely used insecticide on fruit in 1959.

Kelthane W appears to be an outstanding new miticide with broader usage in store for it next season.

Results obtained from grower applications of Terrachlor and Vegadex were too variable to be conclusive about future usage of these two products.

Among the materials under consideration for addition to the Eastern States program in 1959 are:

Sevin, which involves a new molecule of low toxicity yet top effectiveness as an insecticide.

Eptam, promising for control of nutgrass which is fast becoming a serious pest.

Perthane, as a late season insecticide for lettuce, spinach and cole crops.

Other new chemicals under investigation are Phosdrin, Simazin, Tedion, Thiodan and Trithion.

Among the major items that have been on the program for several years, 1958 distribution shows substantial increases for the following:

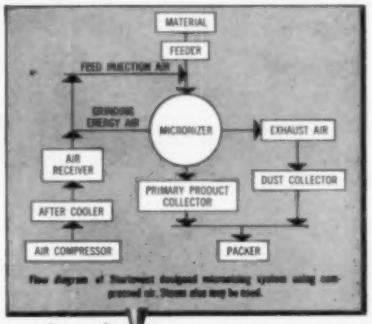
Captan 50W, Dieldrin, Endrin, Malathion, Maneb, Ovex, Nabam, Wettable Sulfur, Systox, TDE, Premerge, Sodium Arsenite, 2,4-D Amine and Ester, Weedone Brush Killer 64, Weedone LV-4.

Changes in our Agricultural Chemical program listing of commodities will be effected during the coming months as more data is presented at the various fall and winter meetings.

The 1958 Eastern States Agricultural Chemical season was one of increased sales, increased income

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and increased effectiveness. Growers will again in 1959 look to the Agricultural Chemicals industry for a steady supply of newer and better chemicals to assist them in making a profitable return on their crops.★★

GROUND APPLICATION

(*From Page* 59)

with one nozzle mounted directly behind each planter press-wheel. In some cases, the conventional open-center press-wheels are covered with non-pressure rubber tires on flat steel tires to form a uniform, flat seed-bed surface. This flat surface enhances the application of post-emergence herbicides, or flame control, since clods are virtually eliminated. In some instances, special rollers are substituted for the planter wheels. Research has not indicated increased weed control with pre-emergence herbicides where the special press-wheels or rollers are used. Successful band applications have been made with the use of boom type sprayers, with one nozzle centered over each row.

The main points to be considered in the application of pre-emergence herbicides are to apply the proper rates of chemicals in desirable solutions on a convenient band width centered on the drill, usually in conjunction with the planting operation.

Herbicidal oils are accepted in most cases as the only herbicides to be used as post-emergence weed control measures in cotton. The oil is applied after the cotton reaches sufficient height to allow the spray to pass under the cotton foliage and before cracking appears on the stem. The herbicidal oils are not being used to any great extent in North Carolina, South Carolina, Georgia, Alabama, Arkansas, Oklahoma, and New Mexico. A large portion of Texas relies upon post-emergence oils as the major means of weed control. Portions of Louisiana and Mississippi find these oils very useful. The cost of oil itself is the limiting factor affecting its use in some areas.

Numerous nozzle arrangements are used, depending upon field and crop conditions. It is difficult to say which nozzle arrangement is the most satisfactory. All states recommending post-emergence applications, however, suggest that the spray be made horizontal, not more than one inch above the seedbed. The oil usually is applied on an eight to ten inch band centered on the crop drill, except in some sections of Texas where an 18 inch band is suggested.

Post-emergence herbicidal oil applications have been made with cultivation operations or separately. When made separate from cultivation, sliding shoes or fowlers are used for placement of nozzles in proper position. Fowlers have been proven successful in numerous cases in Georgia and Alabama for controlling weeds on the shoulder area and to serve as height gauge for post-emergence nozzles.

When the application is made with a cultivation operation, post emergence shields are used to prevent the throwing of loose soil to the treated area. The shields hold the nozzles and serve as a height gauge.

Perhaps the most ideal nozzle arrangement is one in which two nozzles are set at 40 degrees from the line of travel in a backward direction. This should give a complete coverage of the area between nozzles when 80 degrees flat fan nozzles are used. No one arrangement, however, will be satisfactory under all conditions.

None of the state experiment stations recommend a chemical for use as a lay-by herbicide. One chemical, however, is being used commercially in some parts of Arizona and New Mexico. Karmex DW is being applied at a stage of cotton growth that does not permit conventional cultivation without crop injury and yield reductions. New Mexico suggests that the field



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should be clear of weeds immediately prior to the chemical application and no operations of any type should be performed that will stir the soil after the chemical is applied. Arizona suggests the use of the chemical when high clearance machines are needed.

Several states presently are engaged in research on this phase. The Louisiana Experiment station is using two nozzles per row, adjusted to spray the entire area except a four to five inch band centered on the crop row. These nozzles are mounted on the rear of a high clearance sprayer with swivel nozzle adjustments to obtain proper row coverage. Shields may be used to lift the cotton branches to prevent contact with the chemical being sprayed. Preliminary results indicate excellent weed control for a long period of time. The timing of such a herbicide application is being investigated.★★

WASHINGTON REPORT

(*From Page* 72)

Interestingly, estimates of the odds on passage of the food additive legislation at this past session of Congress were given as 50-50 last February, and at one point shifted to nearly 75-25 against passage this year. A major force impelling Congressmen to rush passage of the measure during the final days of the last Congress was pressure from consumer groups, primarily women's clubs and organizations.

* * * * *

Are we trying to help our biggest international competitor to outproduce us? Some farm and industrial leaders here are beginning to think so. They point to the exchange of farm experts between the U. S. and USSR as an example.

From now until next fall, nine separate Soviet farm teams are expected to tour the U. S. on fact-finding missions. Similarly, we will send nine agricultural teams to visit the Soviet Union. Exchanges are in accord with an agreement for the interchange of cultural, educational and technical grroups to improve mutual understanding between the U. S. and USSR.

What concerns farm and industrial leaders is that Soviet teams appear to be learning more here than our teams are learning in Russia. What's more, the Soviets are putting what they learn into an all-out effort to prove that Communist-run farms can outproduce American farms.

Shortly after the visit of top-ranking Soviet farm experts here three years ago, a series of major changes began to show up in Soviet farming. Soviet Prime Minister Khruschev began to decentralize Soviet farming and to give each farm control over its own farm equipment.

Moreover, in key Russian farm areas such as the Kuban, automatic feeders, electric herdsmen, and the practice of letting hogs roam free in fields sown to fodder have been established. Because of these and other improvements imported from the U. S., Kuban farmers claim they have boosted milk production 28 percent, and say their meat production has gone from 32 pounds to 60 pounds per acre and is still going up.

Along with these boasts, the Kuban farmers happily pledged themselves "to overtake the United States in per capita production of meat, milk and butter." Soviet Premier Khruschev, in turn, regards overtaking the United States in per capita production as a major move toward proving to the world that Communism is superior to our free enterprise way of life.

In a world where national power is the basis for determining who dominates world affairs, Soviet Premier Khrushchev has a point. For improvements in farm productivity do more than boost farm output. They also free manpower to boost industrial production and armed forces strength.

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labor force is tied down to farm production. Although the U. S. labor force is smaller by far, the fact that 8,000,000 American farm workers can produce all the food and fiber we need leaves us with a non-farm labor force of about 62,000,000 compared with about 60,000,000 non-farm workers in the USSR.

Some industry leaders, particularly in the chemical industry, are fearful that increased Soviet production of pesticides and fertilizers could put the Communists in a position to dump their products into our markets and wreck our industry. Agricultural advances freeing more manpower for industrial jobs would help put the Communists into this position.

In addition, a proposal of even more serious threat to this country's security is a request that the USSR be allowed to acquire U. S. chemical plants and processes. With the possible exception of the steel industry, there is nothing more important to the U. S. than its chemical industry. We cannot very well afford to furnish the USSR with the American know-how and experience that goes with a complete chemical plant.

An increasing number of people are beginning to wonder whether it's wise to help our only potential rival in the world to become stronger than we ourselves are.

* * * * *

The Tennessee Valley Authority's fertilizer activities are under fire again. This time from the U. S. Chamber of Commerce which contends that the agency's program has "actually gone beyond research and development." In a study published Aug. 31, the chamber charges that TVA's production of chemicals "has become competitive with the taxpaying, investor-financed fertilizer industry."

The chamber refers to a Department of Agriculture report issued last June which states that the fertilizer industry, particularly in the case of nitrogenous materials, has more production capacity than it can use at present. The chamber points out that TVA prices its fertilizers about 10 per cent below the competitive market.

TVA's cost figures, the chamber of commerce feels, are of "dubious value" because TVA's whole research program is charged off as a developmental expense and is not reflected in the manufacturing costs of the fertilizer produced. On the other hand, a comparable private enterprise manufacturer would certainly need to include his research and development costs in the price of his products. He would necessarily have to finance research from revenues from the sale of the product, for he does not have a source of appropriations beyond his revenue.

More importantly, however, TVA does not pay interest on its money and does not pay any taxes on its fertilizer program.★★

FERTILIZER VIEWS

(*From Page* 69)

ferential response of cotton and oats to phosphorus on two Mississippi soils, and concluded that the poor response to phosphorus when nitrogen levels were low is due to the inability of the crops to utilize the applied phosphorus because of the inadequate supply of nitrogen.

The efficient feeding of crops is a complicated affair which may be resolved by a soil test, provided the tester can draw upon experience and knowledge based on proper correlations with extensive field experiments for his interpre-

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tation. The simple chemical test without correlated fields data is no more than a guess.★★

(3) Coleman, Effect of Nitrogen on Response of Cotton and Oats to Phosphorus, *J. A. Soc. Agr.*, No. 36, 1944.

PEST ROUNDUP

(*From Page* 65)

dalgo County fields,where at least half of all squares and bolls had been destroyed. Controls for the bollworm were still being required in late August in some Arizona fields.

The cotton boll weevil was on the increase, with migrations in North and South Carolina, Tennessee, Alabama, Arkansas, Oklahoma and in the hill section of Mississippi. Counts were up in Louisiana and in the irrigated fields of central Texas. Spider mites were heavy in some Kern County, California fields, as well as localized areas of Texas, Arkansas, Alabama, Tennessee and South Carolina. ★★

SOIL TESTS

(*From Page* 48)

to work efficiently must work the year around; they cannot test all samples in three to four weeks in the spring and get the results back to the farmers in time. We need to get more samples taken in summer and fall. In the case of spring samples, all too often the farmer has planted his crop before he gets the results and recommendations. ★★

RESEARCH COSTS

(*From Page* 43)

get the chemical to the site of action in the most efficient form. A fungicide must be stable in storage for periods of a year or longer, must not be affected by extremes of temperature from below 0°F. to above 100° F., and must neither separate nor aggregate during storage."

Discussing "labeling," Dr. Wellman observed that all the claims made about a new fungicide must be not only the truth, *but all the pertinent truth,* and finally they must be the truth in language the farmer understands. "It is in this last phase," he commented, "that industry frequently falls down. The claims must be simple, clear, concise and forceful. A most serious responsibility is to word labeling so that a farmer following the directions will harvest a crop containing a residue not in excess of that allowed."

Turning to "publicity and advertising" Dr. Wellman noted that advertising must communicate basic facts about the new product and urge growers to buy; literature must teach growers how to use the product. "Distributors, dealers and their salesmen must have been educated so that they are prepared to tell the farmer what the material will do and are confident enough to convince him that he should use it."

In the final analysis, the speaker observed, a product will achieve optimum success only if it helps the farmer to grow the maximum possible yield per acre of the best quality crop at the lowest possible cost. And "just as the farmer must have good business management", he added, "so must the chemical industry which produces and distributes the chemicals. With the high cost of development, no company can remain long in this field if it can not plan and execute its merchandising so that it will not only recapture its research investment, but will also obtain the rewards in profits that its risk and enterprise justify."★★

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EDITORIAL

(*From Page* 29)

or twenty thousand to make sure that the professionals in the field knew all about our new "world beater." For unless they know, the story seldom filters down to the farmer. He is often too busy or uninformed to know what he is using or why. He buys what those he trusts tell him he should.

With all this preoccupation we have had over the past few years with the basic chemical producers upgrading their raw materials, selling the end user and eliminating all the steps in between, we get the feeling that some of them may be trying to get to home plate without touching all the bases.

PATENT CASE

(*From Page* 45)

ing that the injunction restraining their client be modified, and the second requesting that it be rescinded completely because of misuse of the patent.

In the recent decision by Judge Moore (August 25th) no action was taken on these two motions, the judge stating that "it seems to me that any questions which could be raised in connection with the motions have already been passed on." In addition to finding Roberts Chemicals in contempt, and awarding damages to Rohm & Haas, Judge Moore vacated the restraining order which Rohm & Haas has interpreted as "preventing us from implying that our patent was violated by the use of Roberts' 'Amobam' on citrus." D. S. Frederick, vice-president of Rohm & Haas, added: "We are gratified that this ruling by Judge Moore confirms our position that the use on citrus of nabam, zineb and Amobam is a use covered by our patent." Strengthening of the injunction, requested by attorneys for Rohm & Haas, was denied by Judge Moore. In his opinion, "It is enough that defendant be enjoined to the extent now provided for in the order. I believe that with such a modification as plaintiff asks it would in effect have a monopoly of the product itself, which the patent does not allow."

In his recent decision Judge Moore referred specifically to a letter sent out to the trade October 17, 1957 by the defendant Roberts Chemicals, Inc. He ruled that such a letter "is a clear violation of the injunction and must be discontinued," for "while purporting to disclaim any intention of selling the products for fungicidal use, the impression is nevertheless created that such is the purpose of the sale." Also he commented that "the furnishing to one of its customers of labels formerly used by it, containing recommendations for use in an infringing manner, could have no other purpose than to encourage this customer to help carry out the infringing use."

Concerning Roberts' claims that new uses have been developed for "Amobam" which do not infringe on the R & H patent, Judge Moore recognized "the possibility that other uses may be or may have been found for nabam, amobam, zineb, and similar products, which will not or do not constitute an infringement of plaintiff's process patent." He indicated, however, that in his opinion this question was not before him for decision, as the case had already been decided by the Court of Appeals and he had no authority except to enforce the appellate court's opinion. He observed that "the fact that the use of a patented process in the manner provided in the patent may accomplish some other useful purpose than the one specified in the patent does not establish this secondary use as a noninfringing use," thus apparently dealing with one of the defendant's claims in support of its continued sale of "Amobam."

Mr. Fike, in response to an inquiry from AGRICULTURAL CHEMICALS about "Amobam," states that the material was first used with calcium hypochlorite in Florida on a commercial scale during the winter of 1957-58, and all field data so far compiled has been based on these Florida trials. In addition to the Florida work, he said, in the north, "Amobam" and calcium hypochlorite gave "excellent disease control this season."

A technical bulletin dated May 14, 1958, reviews test results to date. Within the next few months, he indicates, commercial field data from tests in northern areas will be completed and will be assembled in a new technical bulletin together with data from several experiment stations which have been testing the product.

Following issuance of Judge Moore's decision, Mr. Fike restated his belief that Roberts still have the right to sell "Amobam" for uses which do not infringe the R & H patent. The president of Roberts Chemicals gave AGRICULTURAL CHEMICALS the following statement: "Roberts has tried to remain completely open and above board in their activities since the injunction. They have kept R & H and the court fully aware of their activities. They have attempted to abide by both the spirit and the letter of the injunction, but at the same time they have sincerely believed in their right to sell for noninfringing uses. At the present time the court has not held that the use of 'Amobam' plus calcium hypochlorite infringes on the patent. Roberts has attempted to get a satisfactory statement from R & H on this question by way of interrogatories, but R & H has objected to these interrogatories and failed to answer them. Roberts has asked the circuit court to reopen the case to take new evidence and settle this question. Roberts hopes for a speedy answer and welcomes any opportunity to clarify the picture."

CLASSIFIED ADVERTISING

Rates for classified advertisement are ten cents per word, $2.00 minimum, except those of individuals seeking employment, where the rate is five cents per word, $1.00 minimum. ***Check must accompany all classified advertisements.*** **Address all replies to Classified Advertisements with Box Number care of AGRICULTURAL CHEMICALS, P. O. Box 31, Caldwell, N. J. Closing date: 10th of preceding month.**

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THE FIRST MISSISSIPPI CORP. is planning to construct a multiwall paper bag plant at Yazoo City, Miss. This is the fourth plant to be announced by First Mississippi this year. An oleum facility has been established at Pascagoula, and a superphosphate plant is under construction.

THE VIRGINIA-CAROLINA CHEMICAL CORP., Richmond, Va., reported reduced sales and earnings in the fiscal year ended June 30 because of the closing of a marginal phosphorus furnace and a loss in fertilizer volume. Sales totaled $67.5 million, compared with $70.5 million last year.

SAFETY SCHOOLS

(*From Page* 36)

an audience-participation period in which everybody present can have a definite part. At the Chicago school this discussion was monitored by John Gallagher, NSC staff liaison man for the fertilizer section. The entire audience was divided into small groups, each of whose members presented a problem for discussion, and from these one was selected for solution. After an hour of thrashing these out, the various groups swapped problems and had another round at settling them. As it turns out, this becomes a rather lively free-for-all which results in some rather vivid and impressive expressions of the collective minds industry men present on some of the big problems they deal with.

In closing the Chicago meeting, the school director, John E. Smith, declared that while this was the first attempt at holding a school in the midwest and there was always room for improvement, he felt that it had been highly beneficial to all.

Plans for the full series of schools to be held during 1959 are to be arranged by the executive committee of the fertilizer section when they gather for the National Safety Congress in Chicago, Oct. 20 and 21.★★

DIAZINON USES

(*From Page* 34)

Volume of Production

Diazinon has also moved extensively into the home and garden market in Florida for control of lawn chinch bugs. The use of this product for the control of fruit and vegetable insects during 1958 increased materially. Diazinon is now definitely established in the pest control field as "the insecticide" for the control of resistant roaches, and we are optimistic that

the volume of Diazinon used in this field will continue to increase.

Our miticide, *Chlorobenzilate*, continues to give excellent control of most species of mites which attack citrus and certain soft fruits in California and the Northwest. This season also saw the introduction of chlorobenzilate for the control of rust mite and other mites attacking citrus in Florida.

Methoxychlor continues to increase in volume each year and 1958 was no exception. Although methoxychlor sprays are no longer permitted on dairy animals, the increased use of this product in dust form on dairy cattle, in household insecticides, and for protection of stored grains, has more than offset the loss resulting from the F.D.A. ruling against the use of methoxychlor sprays on dairy cattle.

During 1958, distribution of our *Sequestrene* brand metal chelates has been increased, and we can now say that these products have been accepted throughout the entire country. The increased use of minor elements in fertilizers has greatly increased acceptance of these products. Introduction of a new iron chelate, for use in calcareous and other highly alkaline soils of the Southwest, greatly benefited our sales program in this field. Sequestrene chelates continue to show great promise and increased sales are expected as new uses continue to develop.

The highlight of 1958 for Geigy Agricultural Chemicals was the highly successful introduction of our new herbicide, *Simazine* 50W, for selective weed control in all types of corn. Although registration on corn was received rather late in the spring, acceptance surpassed expectations, and Simazine now takes its place as a preferred pre-emergence herbicide for use on corn. In addition to its use on corn, Simazine 50W was used extensively for selective weed control in ornamentals and nursery stock and for non-selective industrial weed control.

In summary, I might say that in spite of the late spring freezes in Florida and the excessive rain which delayed cotton planting in the cotton belt, 1958 has proved to be a successful year for Geigy. We look forward to a continued increase in the use of our products. This increase will result from development of new uses for our products and continued education of growers to the uses for which these products are presently approved. ★★

INDUSTRY PROBLEMS

(*From Page* 39)

The agricultural chemical business in Canada is highly competitive. On this commodity, there is no tariff protection, with the result that imported chemicals made by much larger manufacturing firms in other countries compete actively with the home-made products. These producers in other countries such as U.S.A., Great Britain, and Germany have larger production units due to the large domestic market, plus export. The extent or size of the market left for Canadian producers is not large, as has been pointed out in my opening remark and in many products the total Canadian market could support only one producer. In recent years, the home producer has been further handicapped by the practice of foreign producers dumping their surplus production on the Canadian market at prices below the current prices in their own markets. The manufacturer has to be competitive to stay in business, and so cost is of vital concern. Since the volume of business available to the Canadian manufacturer is small compared to his foreign competitors, he is at a distinct disadvantage cost-wise. Unless costs can be reduced some other way, he cannot compete. Some measure of tariff protection would have a favorable effect in increasing the volume of business available to the Canadian producer, without increasing the price to the consumer.

Research

The size of Canada's agricultural chemical market does not encourage the setting up of adequate research facilities for the industry. As a result, associated organizations for screening work on chemicals and toxicology studies do not exist in this country. To obtain new products, the Canadian manufacturer usually relies on assistance from the parent company or agreements with companies in other countries. While this has worked out reasonably well in the past, it is nevertheless to be regretted that more research is not done by industry in this country. The control of wild oats by chemical means is a research problem of vital concern to Western Canada, but not so important to other countries. Much more basic research should be carried out on this important problem in Canada; and it should be done in Canada, because it is essentially a Canadian problem. I believe that Canadian manufacturers require a large share of the Canadian market to enable them to engage in research for new products and on a long term basis.

While research leads to improved and new products, introduction of these new products sometimes has a temporary undesirable effect on inventory control. Obsolescence is the price which must be paid for technical improvement. The almost continual change in products, particularly in orchard chemicals, leads not only to obsolete inventory, but also sometimes necessitates expensive factory equipment changes. New products do not necessarily mean new markets because a new product can merely replace an old one, e.g.—malathion vs parathion.

In this country with such a strong basic agricultural economy, and where such a large potential does exist for the production of agricultural chemicals, growth of the manufacturing industry should be encouraged, thus strengthening further our National economy. ★★

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TALE ENDS

ENTOMOLOGISTS at the University of California, Los Angeles, have been working on the control of insect pests by the use of non-toxic dusts. The dusts act by absorbing the wax coating on the body of the insect. With this natural protection removed, body fluids are dried up. Advantage is lower cost, because no toxicant is needed, and no problem of development of immunity. To date the studies, under the direction of Walter Ebling, have been concentrated on household pests such as roaches, ants, fleas, ticks, flies, mosquitoes, termites, etc. Maybe it works in the laboratory, but on a cash crop out in the field, we bet they'll still be slipping in a little DDT, or pyrethrum or such, just to be on the safe side.

* * * * * *

The Four Leaf Phosphate Department of International Minerals & Chemical Corp. has named six fertilizer dealers on an advisory board to help plan its services for farmers and agricultural chemical dealers. At a recent meeting in Skokie, Ill., the board joined IMCC specialists in discussing advertising, sales promotion, market research and customer needs and motivation. One of the first results was a decision to undertake a series of customer surveys, sales analyses, price and credit reports, advertising promotion plans and other merchandising ideas. (Story on page 83).

* * * * * *

The '58 pesticide season was mighty slow getting under way last spring, but our agents advise us that it is lasting longer than any season for many a year. With "frost on the punkin" weather fast approaching, buyers are still ordering out supplies of pesticides. One toxicant supplier around the New York area reports the biggest August in his company's history, — and on the Tuesday morning after Labor Day, when in any other year he would have been setting out for the NAC convention, there were 49 orders on his desk.

* * * * * *

And, speaking of the NAC convention, one final reminder! It's at the General Oglethorpe in Savannah, October 29-31. Not at the Bon Air in Augusta, as originally scheduled. Make sure your reservations have been switched, and if you have to settle for accomodations in down town Savannah at the De Soto, better bring a pogo stick along.

* * * * * *

Ed Littooy, who conducts the affairs of Colloidal Products Corp. out in Sausalito, Calif., practically in the shadow of the Golden Gate Bridge, reports that he is back in a vertical position once more after recuperating from a heart attack which struck him in early summer. "Now feeling great", he reports, "and will soon be a member in good standing of the Cardiac Club". He expected to be in shape to return to the office, at least on a part time basis, early in October.

* * * * * *

American Cyanamid Co. sponsors "Farm Newsreel," the first syndicated television program devoted exclusively to news for farmers. A fifteen minute program, it is viewed in 52 major farm areas in 23 states.

* * * * * *

Preliminary tests are being conducted on a new spray material which is said to give promise of being effective in the control of Dutch elm disease. The material was developed by Abbott Laboratories, and tests are being made jointly by Abbott and Dow Chemical Co. The exact nature of the material under test is still in the "hush hush" department. "We are in such an early stage of research", says Dow, "that a disclosure would be out of line." They indicate that their only purpose in making any announcement now regarding the test work was to head off the usual rumor and faulty information which tends to crop up when word leaks out on such trial applications. Work to date has shown only "the possibility of some activity against the disease." If results justify, further tests will be scheduled under various geographical and weather conditions. For the moment, there are no supplies of the new material available, either for sale or sample.

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Mr. Spillman has been in fertilizer manufacturing operations since 1925. He is on the Executive Committee, and one of the original founders of the Fertilizer Industry Round Table. Mr. Spillman is known throughout the industry as an outstanding fertilizer manufacturing technician, and has contributed many important developments in standard manufacturing technology.

Fertilizer Manufacturing Cooperative, Inc. is one of the "Early Pioneers" in granulated fertilizers, and its production men are among the technical leaders of the industry. Mr. Spillman welcomes visitors to the plant, and is cooperative in exchanging information on plant techniques, production or technical data.

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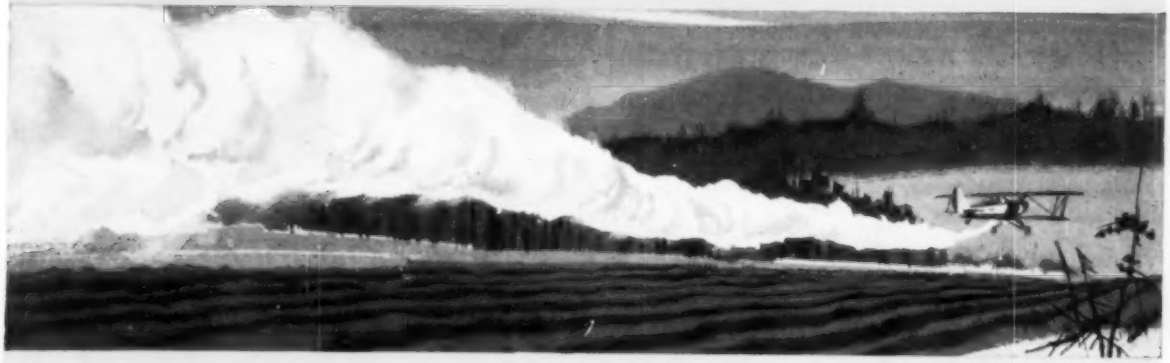
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